

THIRTY-SEVENTH ANNUAL REPORT
OF THE
DEPARTMENT OF MARINE AND FISHERIES
1904
MARINE

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

PRINTED BY S. E. DAWSON, PRINTER TO THE KING'S MOST
EXCELLENT MAJESTY

1905.

[No. 21—1905].

*To His Excellency the Right Honourable SIR ALBERT HENRY GEORGE, EARL GREY,
VISCOUNT HOWICK; BARON GREY OF HOWICK; A BARONET, G.C.M.G., &c., &c.,
&c., Governor General of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Legislature of Canada, the Thirty-Seventh Annual Report of the Department of Marine and Fisheries, Marine Branch.

I have the honour to be,

Your Excellency's most obedient servant,

RAYMOND PRÉFONTAINE,

Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,
OTTAWA, December, 1904.

CONTENTS.

	PAGE.
REPORT SUBMITTED BY MINISTER.....	ii
REPORT OF DEPUTY MINISTER.....	i

SUBJECTS:

Acetylene Lighting.....	4
Anticosti Lightship.....	8
Buoys and Beacons	5
Coasting Trade of Canada.....	12
Correspondence.....	21
Departmental Expenditure (Marine Branch).....	3
Dominion Steamers, their names, etc.....	9
" " Expenditure for maintenance of.....	10
Hudson Bay Expedition.....	20
Hydrographic Surveys.....	2
Ice Boat Service between Capes Traverse and Tormentine.....	16
Legislation	22
Life Boat Stations.....	7
Lighthouse Board, Composition of.....	1
Lighthouse Board, Functions of.....	2
Lighthouses, Lightships and Fog Alarm Stations in Dominion.....	3
Lighthouse Service.....	3
" " Organization of.....	4
Lightship new.....	5
Live Stock Shipments.....	21
Marine Hospitals	17
" Schools	14
Masters' and Mates' Certificates.....	14
" " " " Statement of Receipts and Expenditure.....	16
Merchant Shipping	9
Meteorological Service.....	20
Minister's Inspection of Submarine Signalling.....	9
Navigation	2
New Lightship.....	5
Obstructions to Navigation, removal of.....	17
Oil for Use of Lighthouses.....	19
Outside Service, Marine Branch.....	21
Pilotage System between Montreal and Quebec	14
St. Lawrence Ship Channel.....	2
Sick and Distressed Mariners.....	17
" " " " Statement of Receipts and Expenditure.....	19
Signal Service	8
" " Stations, Names of.....	8
Sorel Shipyard.....	2
Steamboat Inspection	10
" " Statement of Receipts and Expenditure.....	11
Steamboat Inspectors, List of.....	12
Submarine Signalling.....	9
" " Minister's Inspection of, between New York and Boston.....	9
Winter Steam Service between Prince Edward Island and the Mainland.....	14
Wireless Telegraphy.....	9
Wrecks and Casualties.....	7

ILLUSTRATIONS.

AT END OF REPORT.

Iron lantern under construction for Lighthouse Lennard Island, B.C.

Louisburg Fog Alarm, N.S.

Michipicoten Harbour Lighthouse, Ont.

Niagara Front Range "

Port Colborne Breakwater Lighthouse, Ont.

 " " " under construction.

Sand Beach Lighthouse and Pier, Quebec.

Dominion Lighthouse Depot, Prescott, Ont.

Catoptric Revolving Light.

First Order Quick Flashing Light.

North Channel Dyke Gas Light.

Steamer *Scout*, Lighthouse and Buoy tender.

Submarine Signal receiving apparatus.

Canadian Armed Cruiser *Canada*.

 " " " *Vigilant*.

APPENDICES.

CHIEF ENGINEER'S REPORT	PAGE. 23
-------------------------------	-------------

SUBJECTS.

Aids to Navigation established since last report :—

IN BRITISH COLUMBIA.

Danger reef	51
Fraser river bridge	52
Lennard Island	51
Proctor Middle round buoy	52
Seechelt	52

IN NEW BRUNSWICK.

Cedars	29
Miramichi North-west bridge	30
Tiner point	29

IN NOVA SCOTIA.

Borden Wharf	32
Canning river	32
Cape Sharp	32
Gilbert point	32
Grand passage	32
Granville Centre	32
Iona	34
Lurcher Shoal	33
Macfarlane point	35
Marble Mountain	34
Musquodoboit	33
Pictou island west end	35
Porter point	32
Spencer island	31
West Arichat	34

IN ONTARIO.

Cutler	46
False Ducks	44
Graham	44
Killbear point	45
Lion's Head	45
Niagara-on-the-lake	44
North Sister rock	46
Port Colborne	45
Providence bay	46
Shoal island	46
Stokes bay	45

Aids to Navigation established since last report—*Concluded.*

PAGE.

IN QUEBEC.

Anticosti Lightship

Bécancour

Bryan island

Cap Madeleine Village range

Champlain upper range

Contrecoeur Traverse range

Duthie point

Garde point

Grondines point range lights

" upper range

Lower Traverse

Pointe à Basile

Sandy beach point

Ste. Félicité

39

41

38

41

41

42

38

38

40

41

40

40

39

40

Aids to Navigation discontinued since last report :—

IN NEW BRUNSWICK.

Hatfield point

Williams landing

30

30

IN ONTARIO.

Soulanges Canal

46

IN QUEBEC.

Bay St. Paul

Grondines

Lower Traverse lightship

42

42

42

Aids to Navigation, changes in, since last report :—

IN NEW BRUNSWICK.

Cape Enrage

Oak point

Richibucto

30

30

30

IN NOVA SCOTIA.

Digby pier

Guysboro'

Inner Sambro island

Mabou

Pictou

" bar

Sand Spit

Wolfville

35

36

36

36

36

36

35

35

SESSIONAL PAPER No. 21

Aids to Navigation, changes in, since last report—*Concluded.*

PAGE.

IN ONTARIO.

Amherstburg.....	47
Burlington Channel.....	46
Coppermine point.....	48
Elliott point.....	47
Fort Malden.....	47
Kaministiquia river.....	48
Kingsville.....	47
Pie island.....	48
Pointe au Baril.....	47
Port Credit.....	46
Port Dover.....	47
Sault Ste. Marie.....	47
Victoria island.....	48

IN PRINCE EDWARD ISLAND.

Annandale.....	37
New London.....	37
Summerside.....	37

Beacons unlighted.....	57
Buoyage.....	25
Buoys and beacons :—	

IN BRITISH COLUMBIA.

Atrevidor reef.....	53
Baynes Sound.....	53
Browning passage.....	52
Escape reef.....	53
First Narrows.....	52
Gibson's landing.....	53
Hecate passage.....	52
Hornby island wharf..	53
Kelpbar.....	53
Nelson rock.....	53
Rock point reef.....	53
Tottenham ledge.....	53
Texada island.....	53
Village point.....	52
Watson rock.....	53
Whaleton bay.....	53

IN NEW BRUNSWICK.

Gray mare ledge.....	31
Quaco.....	31
Shediac North Channel..	31
Shippegan.....	31
Vin bay.....	31

Buoys and Beacons—*Concluded.*

PAGE.

IN NOVA SCOTIA.

Blind and Shad bays.....	37
Bull rock.....	36
Crawford ledge.....	36
Guion island.....	37
Halifax.....	37
Indian harbour.....	37
Peters island reef.....	36
Shag bay breaker.....	37
Winter buoy service.....	37

IN ONTARIO.

Brown's point, Lake St. Louis.....	49
Casgrain rock.....	50
Christian island.....	50
Curran rock.....	50
East end of Lake Superior.....	50
Fiddler's Elbow.....	49
Foot of Wolfe island.....	49
Kaministiquia river mouth.....	51
Lone rock.....	50
Lockerbie rock.....	50
Mink island reef.....	51
Port Arthur.....	51
" Colborne.....	50
" Louis.....	49
Seguin bank.....	50
Snake island, Middle ground.....	49
South Lancaster.....	49
Three Star Shoal.....	50
Toronto.....	49
Twin rock, Middle ground.....	50
Way Shoal.....	49

IN PRINCE EDWARD ISLAND.

Georgetown.....	38
New London.....	38

IN QUEBEC.

Grondines to Ile Bigot.....	43
Outarde bay and river and Bersimis.....	42
Pointe aux Trembles to Longue Pointe.....	44
Point Lévis Shoal.....	43
" Nicholas.....	43
" St. Antoine.....	43
Traverse of St. Roch.....	43
Trembles Shoal.....	43

SESSIONAL PAPER No. 21

	PAGE.
Buoys and Beacons maintained in Canadian waters in 1904 :—	
In British Columbia.....	57
" New Brunswick.....	56
" Nova Scotia	55
" Ontario	54
" Prince Edward Island.....	56
" Quebec.....	54

Hydrographic Work.....	26
Office Work.....	24
Publications	24
Staff.....	23
Removal of Obstructions.....	25
Tidal and Current Survey.....	27
Unlighted beacons.....	57

COMMISSIONER OF LIGHT'S REPORT.....	58
-------------------------------------	----

SUBJECTS :

Acetylene lighting.....	59-61
Aids to Navigation, List of.....	71
" Maintenance of.....	58
Automatic Acetylene gas buoys.....	58
Buoy Contracts.....	58
Changes in following lights :—	
Bird Rocks mechanism	59
Father Point siren.....	59
Gannet Rock.....	59
Little Métis.....	59
Matane.....	59
Martin River.....	59
Partridge island.....	59
Depot at Prescott.....	58-60
Fog Alarm plants.....	58
Dominion lighthouse depot.....	58-60
Gas buoy service between Grondines and Port St. Francis.....	58
Gas buoys, Extension of.....	63
" Montreal—Kingston Division.....	62
" Ship Channel Division.....	63
Illuminants.....	58
Lighthouses and lightships burning acetylene.....	59
Prescott depot.....	58-60
Submarine Bells established :—	
Atlantic Coast Stations	70
St. Lawrence route Stations	69
Lightships on which established.....	69-70
Stations proposed to establish.....	70
Submarine bell buoys.....	69
Submarine Signalling	58-64
" apparatus, Government Steamers to be equipped with.....	69

	PAGE.
DOMINION STEAMERS, COMMANDER SPAIN'S REPORT.....	93
" " their armament, speed, dimensions, movements, etc. :—	
<i>Aberdeen</i>	95
<i>Bayfield</i>	95
<i>Brant</i>	96
<i>Canada</i>	97
<i>Champlain</i>	98
<i>Constance</i>	96
<i>Curlew</i>	96
<i>Druid</i>	95
<i>Falcon</i>	97
<i>Frontenac</i>	93
<i>Gulnare</i>	94
<i>Kestrel</i>	97
<i>Kingfisher</i>	94
<i>La Canadienne</i>	96
<i>Lansdowne</i>	94
<i>Lady Laurier</i> ...	96
<i>Maisonneuve</i>	93 94
<i>Minto</i>	94
<i>Montcalm</i>	98
<i>Osprey</i>	95
<i>Petrel</i>	95
<i>Quadra</i>	96
<i>Reserve</i>	97
<i>Scout</i>	97
<i>Shamrock</i>	96
<i>Stanley</i>	95
<i>Vigilant</i>	97

Expenditure.....	141
" since Confederation.....	144
Hudson Bay Expedition Report.....	116
Hydrographic Surveys Report	75

SUBJECTS :

Colonial Surveys, British Admiralty's request <i>re.</i>	76
Lake St. Louis Survey.....	76
" Superior.....	75
" Winnipeg.....	75
Magnetic Observations from Lake Superior.....	76
" " Boucherville to Lake St. Peter.....	76
Pancake Shoal, Water in Neighbourhood Surveyed.....	75
River St. Lawrence Survey.....	75
Surveys Placed under control of Department	75

SESSIONAL PAPER No. 21

	PAGE.
Investigations into Wrecks, Report on.....	99
SUBJECTS :	
Accidents to Vessels in River and Gulf of St. Lawrence.....	99
SS. <i>Athenian</i> investigation.....	101
" <i>Catalone</i>	105
" <i>Kensington</i>	101
" <i>Kodan</i>	101
" <i>Louisburg</i>	101
" <i>Turret Bay</i>	107
" <i>Turret Chief</i>	104
" <i>Turret Cape</i>	103
" <i>Vancouver</i>	100-102
" <i>Verax</i>	101
Lighthouse Board Report	73
SUBJECTS :	
Aids to Navigation to be established, location and cost.	73
Aids to Navigation, Improvements to.....	73
Composition of Board.....	74
Functions of Board.....	73
Submarine Bells, where to be located... ..	74
Lighthouse Keepers, Dates of appointment and salaries.....	151
Live Stock Shipments	171
Marine Schools, Report on	111
Meteorological Service Report.....	77
SUBJECTS :	
Central Office Staff	78
Meteorological Stations.....	84
Magnetic Observatory.....	87
New Stations—British Columbia.....	77
" North-west Territories.....	77
" Manitoba.....	78
Photography.....	82
Predictions, number fulfilled, etc., with localities	80
Seismological Observations.....	83
Station Equipment	82
Storm Warning Stations	82
Storm Warnings given	82
Time Service	82
Naval Militia of Canada, Bill regarding.....	98
Pilotage between Montreal and Quebec, Report on.....	109
Revenue Statement <i>re</i>	140
Reward for Saving life.....	181
Sick Mariners Dues Statement <i>re</i>	143
Signal Service Report.....	137
Statement <i>re</i> revenue.....	140
" expenditure.....	141
" Sick Mariners Dues.....	143
" Steamboat Inspection Collections.....	150

	PAGE.
Steamboat Inspection, Report of Chairman.....	88
SUBJECTS :	
Board Meetings.....	89
Casualties reported, names of vessels, etc.....	90
Prosecutions for violation of the law....	90
Steamers, number inspected, their tonnage, and fees collected.....	88 89
Submarine Bells established.....	69 70
" " stations proposed.....	70
" " bell buoys	99
Submarine Signalling.....	58-64
Summary of Expenditure.....	141
Wireless Telegraphy, report on.....	114
Wharfingers, list of.....	166

REPORT

OF THE

DEPUTY MINISTER OF MARINE AND FISHERIES

To the Honourable
RAYMOND PRÉFONTAINE,
Minister of Marine and Fisheries.

SIR,—I have the honour to submit my report as Deputy Minister, for the fiscal year ended June 30 last, and to give an account of the business of the department up to date, so far as such relates to the Marine branch.

Reference is made to the construction of lighthouses and other aids to navigation : gas buoys and acetylene lighting : Steamboat Inspection : the Shipment of Live Stock : Meteorology : Life-boat Stations : Investigations into the causes of wrecks and casualties : Hydrographic Surveys, etc., details of which appear in the appended reports of the Chief Engineer : the Commissioner of Lights : Commander of the Canadian Marine Service : the Chairman of the Board of Steamboat Inspection, and the Officer-in-Charge of the Hydrographic Surveys.

During the year I have, as opportunity offered, visited the agencies of the Department, thus obtaining personal insight into the important work carried on by the Outside Service—as also useful information for guidance, when matters pertaining thereto are under consideration. In connection with this I had the pleasure and advantage of accompanying you on your recent visit to the Agency of the Department in British Columbia, on which occasion you authorized the immediate carrying into effect of suggestions for the improvement of the Lighthouse Service in that province, while other recommendations were noted for the careful consideration and attention of the department.

LIGHTHOUSE BOARD.

With the object of carrying out your earnest desire for the improvement of the lighthouse service and the consideration of all cognate matters, by Order in Council of the 26th of February last, the Lighthouse Board was organized—consisting of the Deputy Minister as Chairman, the Chief Engineer, the Commander of the Canadian Marine Service, the Commissioner of Lights—officers of this department—and Mr Hugh A. Allan, of Montreal, as representing the shipping interests generally : also, when questions pertaining to the aids alluded to within the Montreal or Quebec Pilotage Districts are under consideration by the Board, the president for the time-being of the Corporation of Pilots for these respective districts is (ex-officio) a member

4-5 EDWARD VII., A. 1905

of the Board when summoned by the Chairman to attend meetings thereof. Mr. W. C. Gordon, a first class clerk, is secretary of the Board.

The functions of the Board are, to consider all applications for the improvement of the Lighthouse Service, the establishment of additional aids to navigation, and such matters as tend to the protection of life and property of those engaged in the mercantile marine of the Dominion. The Board meets from time to time as necessity arises, and its decisions—if sanctioned by you—are carried into effect. While the Board has only been in existence for a comparatively short time, the work already accomplished through its agency (for details see annexed report) has proved highly satisfactory to the shipping interests and is much appreciated by the travelling public and those engaged in navigation.

HYDROGRAPHIC SURVEYS.

So as to systematize and facilitate the work in connection with the hydrographic surveys, for many years performed by this department, the administration of this branch of the public service was assigned to the department, under the provisions of 55-56 Victoria, Chapter 17, and an Order in Council was passed on July 23, 1904, transferring the hydrographic work of the Departments of Public Works and of Railways and Canals to the Department of Marine and Fisheries, so that that Department alone be charged in future with the management and control of such surveys. The same Order in Council directed that the duties, powers and functions, with respect to any work or class of works conferred upon the Minister of Public Works by any Acts relating to Harbour Commissioners, be transferred to and exercised by the Minister of Marine and Fisheries: also that all records and plans in the possession of the Department of Public Works or of Railways and Canals, which bear on the works above alluded to and which may be required by the Department of Marine and Fisheries for its information and guidance, be forwarded to this department upon application therefor.

Mr. W. J. Stewart, long in the Hydrographic Service of this Department, was, by Order in Council of August 2, 1904, appointed Chief Hydrographic Surveyor.

The report of the Chief Hydrographic Officer is appended.

NAVIGATION.

With the object of organizing the different branches of the public service, relating to navigation, under the immediate control of the department directly responsible for the buoys, lighthouses, pilotage and all questions of navigation; the entire management and control of the River St. Lawrence Ship Channel, together with the dredging and sweeping plant, steamers, and other appliances hitherto used by the Department of Public Works in connection therewith, were, under the provisions of an Order in Council, passed over in July 1st, 1904 to the control of the Department of Marine and Fisheries.

The Government Ship Yard at Sorel, where the dredging plant is constructed and repaired, together with the shops, stores, &c., were also transferred in connection with the same service.

SESSIONAL PAPER No. 21

In this connection Mr. F. W. Cowie, C. E., formerly Engineer in Charge of the Ship Channel, was transferred by Order in Council and appointed Superintending Engineer of that important work, the transfer including the engineering and clerical staff.

Mr. G. J. Desbarats, Director of the Ship Yard under the Public Works Department was also transferred with the entire Sorel Office Staff.

The amount expended on the various branches of the public service comprised in the Marine branch of this department, during the fiscal year ended June 30 last, was \$2,058,955.24 ; the expenditure for the previous year was \$1,587,052.24, not including expenditure for civil government. The expenditure for civil government for the fiscal year ended June 30 last, was \$77,419.11 and for contingencies \$14,565.96, making the expenditure for the various branches of the Marine branch and for civil government \$2,150,940.31. The Fisheries expenditure amounted to \$634,874.01 ; total \$2,785,814.32.

The amount voted by parliament for the different branches of the Department of Marine and Fisheries, including Fisheries and the departmental salaries was \$2,867,013.47. It will thus be seen that the expenditure for the fiscal year was \$88,189.15 less than the amount voted by parliament.

During the past fiscal year the expenditure for maintenance of lights and coast service, amounted to \$685,723.11 ; for construction \$540,675.07, total for maintenance and construction \$1,226,398.18, while for the previous year the expenditure for light-house and coast service, including construction, was \$958,870.26, showing an increase of expenditure for the year ending 30th June last of \$267,527.92.

The appropriation for this service was \$1,251,770.00, the expenditure being \$25,371.82 less than the appropriation of parliament for the fiscal year.

LIGHTHOUSE SERVICE.

The lighthouse service of the Dominion is divided as follows : The Ontario division, embracing all lights from Montreal westward to the North-west Territories ; the Quebec division extending below Quebec and including the river and gulf of St. Lawrence and strait of Belle Isle ; the Nova Scotia division, including St. Paul's Island, Cape Breton, Sable Island and Cape Race, Newfoundland ; the New Brunswick division, the Prince Edward Island division and British Columbia division, each including lights within the provincial boundaries.

The several districts, with the exception of the district above Montreal, are in charge of agents who receive instructions from the department, and report annually in addition to communicating with the department, in connection with all matters relating to their agencies.

The total number of light stations, lightships and fog-alarm stations in the Dominion on June 30, 1904, was 796 and lights shown 996 : the number of steam whistles, fog-horns, bells and guns 99 : the number of lightkeepers and engineers of fog-alarms with masters of lightships was 783.

The report of the chief engineer gives full information in regard to lighthouse construction and the principal repairs to existing stations, as likewise the work done at

4-5 EDWARD VII., A. 1905

fog-alarm stations. The report of the Commissioner of Lights shows in detail what has been accomplished in regard to improvements in the lighting throughout the Dominion.

ORGANIZATION OF THE LIGHTHOUSE SERVICE.

I desire to point out that the increase in the number of 'Aids to Navigation' in recent years, renders it desirable to increase the facilities now existing for their proper inspection and operation. This work has been in charge of the Superintendents of Lights in the different agencies acting under the respective agents. In addition to their duties of inspecting and supervising the aids to navigation under their charge, the Superintendents have had general charge of construction and repairs in their respective districts.

The district west of Montreal, with the exception of the Montreal-Kingston division, which is in the immediate charge of the Assistant Commissioner of Lights, Dominion Lighthouse Depot, Prescott, is known as the Ontario division, and is inspected annually and supplies delivered by a chartered supply boat under the Superintendent of Lights, Ontario Division. The large increase in the tonnage and size of vessels on the Great Lakes necessitates a closer supervision and more frequent inspection than has obtained heretofore. As a first step in this direction, authority has been obtained for the establishment of a buoy depot at a central point in the Georgian Bay, and the creation of the Georgian Bay and North Channel into a separate district will follow. The time has also arrived when the desirability of acquiring a lighthouse supply steamer may be properly considered.

ACETYLENE LIGHTING.

During the past season the use of acetylene as an illuminant for gas buoys and lighthouses has been extended, and it is used in the Ship Channel gas buoys from Grondines to Port St. Francis, and from Sorel to Montreal in the Montreal-Kingston division, and in the Parry Sound district, Halifax harbour, and in the vicinity of Port Arthur, Ont.

The only gas buoys now using Pintsch or oil gas are those in the Quebec agency, and at the mouth of the Detroit river. On the opening of navigation next year, these will be replaced by acetylene buoys.

An automatic acetylene buoy which carries its charge of gas in the form of carbide has been invented by Mr. Thomas L. Willson, and accepted by the department. The utilization of this buoy will permit an extension of the gas buoy service which before was impracticable on account of the difficulty and expense of transporting gas.

43 Lighthouses between Montreal and Kingston burned compressed acetylene during the past season and preparations have been completed to light the remainder of the lights in this division 3 in number, on the opening of navigation.

The range lights in the vicinity of Parry Sound will be lighted by acetylene shortly after the opening of navigation.

An acetylene gas beacon has been established at Kilbear Point, Parry Sound.

A full report on the subject of lighting by acetylene will be found in the report of the Commissioner of Lights.

SESSIONAL PAPER No. 21

NEW LIGHTSHIP.

The new lightship *Anticosti*, No. 15, which was built by the Polson Iron Works, Toronto, proceeded on the July 14 to Montreal and Quebec where she was fully equipped to take her station off Heath Point, Anticosti, where she arrived on August 4 and was moored in position in 22 fathoms water, 8 miles S. 47° E. from Heath Point.

Lat.....N.	49°	3'	0"
Long.....W.	61°	30'	30"

The *Anticosti* is a staunch built vessel of the latest improved designs in lightships for the most exposed positions, and is of the same plan and specifications as the Lurcher Shoal Lightship No. 14, completed last fall by the Polson Company under contract (for the two vessels) at the cost of \$179,950.

The length of the lightship is 121·3 feet ; main breadth moulded, 24·7 ; depth in hold from tonnage deck to ceiling at amidships, 19 feet.

She is fitted up with auxiliary engines and machinery and can steam 9 miles per hour. The hull is of steel. There are two masts and no bowsprit.

Three 7th order lens lanterns encircle each mast-head at an elevation of 60 feet from the water. From these lanterns electric occulting lights are shown, bright for ten seconds and eclipsed for five seconds.

A diaphone operated by compressed air is used as a fog alarm and gives blasts of 4½ seconds separated by silent intervals of 55½ seconds. This lightship is also fitted with a sub-marine bell operated by compressed air and which, during fog rings, the vessel's number 15 as follows : 1 stroke and then an interval of four seconds, followed by five strokes with an interval between each of one second again followed by an interval of ten seconds. On vessels fitted with receiving apparatus the bell should be heard during foggy weather a distance of four miles.

BUOYS AND BEACONS.

The extended coast line of Canada, numerous bays, inlets, rivers, lakes, harbours and other navigable waters require a large number of buoys. Annually the number of buoys has been increased, but in 1903-4 the increase has been larger than any previous year, causing a correspondingly larger expenditure, amounting during the last fiscal year to a total expenditure of \$124,916.32. The cost of the service is materially increased in years when large contracts are made for steel, signal, gas and other coast buoys.

The districts now buoyed number about 350 and the buoys number about 4,200. A record of the names of the shoals, dangers, reefs and various points in channels, harbours, &c., where buoys are placed, is carefully maintained : this enables the department to immediately locate the buoys when any reference is made to them in the correspondence.

The contract system has been found to work most economically and efficiently ; in the majority of instances the contracts are immediately under the supervision of departmental officers, whose duty it is to report to the department any neglect of work

4-5 EDWARD VII., A. 1905

on the part of the contractors. There are now existing about 250 contracts. These contracts are generally made for a period of three years. The contractors are paid semi-annually upon the certificate of the superintending officer. There are, however, some districts not under contract; the work being attended to by the harbour masters. In these cases it has been found more advantageous to place the work immediately in the hands of these officers.

A large number of whistling, bell and other iron buoys are maintained along the coast of the several provinces, by Dominion steamers, particularly on the Nova Scotia, New Brunswick and British Columbia coasts. These buoys are called coast buoys to distinguish them from harbour buoys. The cost of this maintenance by the steamers, is not charged directly to the buoy service, but is included in the cost of maintenance of the steamers, which frequently perform the double duty of attending to lighthouses and the coast buoy service, on the same trip.

The expenditure in connection with the buoy service for the year ended June 30, 1904, was as follows :—

For the province of Quebec, including the port of	
Montreal.....	\$31,996 68
Above Montreal, including Ontario.....	55,236 52
Nova Scotia.....	15,360 10
New Brunswick.....	12,213 36
British Columbia.....	6,580-50
Prince Edward Island.....	3,529 16
	<hr/>
Total.....	\$124,916 32

In addition to the buoys for marking dangers, 106 gas buoys are maintained showing in general occulting lights; 22 in the Quebec Agency, on the St. Lawrence river; 40 between Portneuf and Montreal; 31 between Montreal and Kingston; 1 in Pelee Passage; 1 at the mouth of the Detroit river; 3 in Parry Sound; 3 in Georgian Bay; 2 at Port Arthur, and 3 in Halifax harbour. (Up to Dec 1.).

The coast buoy service maintained by Dominion steamers on the coast of Nova Scotia, consists of 33 automatic whistling buoys, 3 gas buoys, 26 bell buoys and 150 steel can and conical buoys. In the New Brunswick Agency, there are maintained in the same way 21 signal buoys, 17 steel can and conical buoys and one bell boat. The signal coast buoys of Prince Edward Island number 4 and the steel can and conical buoys 15.

In the province of Quebec there are 49 steel can and conical buoys, 1 bell buoy and 1 whistling buoy maintained by the Dominion steamers.

The steamer *Shamrock* is constantly employed in the buoy service on the St. Lawrence river between Montreal and Quebec, and the steamer *Scout* between Montreal and Kingston; the latter steamer attends to the gas buoys above Montreal, on the St. Lawrence river. The steamer *Druid* performs the buoy service below Quebec, and attends to the gas buoys in the Quebec district.

The coast buoy service in British Columbia is performed by the Dominion steamer *Quadra* and the list of buoys in the Chief Engineer's report shows the number of steel

SESSIONAL PAPER No. 21

and other buoys. No whistling buoys have yet been established there, but several are under construction and will be placed when completed. The service at the mouth of the Fraser river is performed by the Public Works steamer *Samson* employed by this department.

Tenders were invited during the past year for the following steel buoys for the different agencies, viz. : 3 automatic whistling buoys, 5 Trinity bell buoys, 3 United States pattern bell buoys, and 11 conical buoys for the Nova Scotia Agency ; 2 automatic whistling buoys, 2 Trinity bell boys, 6 conical buoys and 9 can buoys for the New Brunswick Agency ; 3 automatic whistling buoys, 2 United States pattern bell buoys, 3 conical buoys and 3 can buoys for the British Columbia Agency ; 4 conical buoys and 4 can buoys for the Prince Edward Island Agency ; and 3 conical swift current buoys for the St. Lawrence river. The average cost of each kind of buoy was as follows :—

Whistling	\$950 each.
Trinity pattern bell buoy.....	900 “
United States pattern bell buoy.....	661 “
Conical.....	189 “
Can.....	104 “
Swift Current Conical Buoys.....	315 “

WRECKS AND CASUALTIES.

The total number of casualties to British and Canadian sea-going vessels reported to the department, as having occurred in Canadian waters and to Canadian sea-going vessels in waters other than those of Canada, during the twelve months ended June 30, 1904, was 192, representing a tonnage of 81,143 tons register, and the amount of loss both partial and total, to vessels and cargoes as far as ascertained was \$489,699. The number of casualties to inland vessels so far as have been reported, was slight and unimportant.

The number of lives reported lost in connection with the casualties was 9. A statement of the wrecks and casualties will be found in Supplement No. 1 to this report.

Details of investigations into wrecks and casualties during the season, and the action taken by the department in regard thereto will be found in appended report.

LIFE BOAT STATIONS.

There are 27 life-saving stations in the Dominion of Canada. Most of these have crews that drill twice or three times a month, in the majority of cases twice a month. The men are paid \$2 for each drill and an extra sum is paid when any service is rendered to shipwrecked mariners.

At Long Point, Lake Erie, the men are permanently stationed during the months of September, October and November, at the life-saving station, which is well equipped for their accommodation and for the accommodation of those who may be rescued. The men receive \$40 per month during the three months, and are paid for weekly drills during the other months of the season of navigation.

4-5 EDWARD VII., A. 1905

Kincardine, Ont.—The steamer *Singapore* became water-logged off Kincardine during a storm and drifted on to the beach. The captain, his wife and three children, with three seamen were lashed to the rigging. The Kincardine life-saving crew went to their assistance and after considerable difficulty succeeded in rescuing all hands. The vessel was a total loss.

Consecon, Ont.—The life-saving crew at Consecon were notified that there was a schooner off Point Peter, about twenty-five miles from the station, flying signals of distress. As there was a heavy sea on at the time the life-boat was taken 12 miles by teams and rowed the rest of the way. When they reached Point Peter they were informed that a steamer had come to the assistance of the schooner and towed her away.

Seal Island, N.S.—A new life-boat has been supplied this station.

Herring Cove, N.S.—A new Beebe McLellan life-boat was supplied this station.

Devils Island and Scattarie, N.S.—Stations were also supplied with New Beebe McLellan life-boats.

St. Pauls Island.—The steamer *Turret Bay* ran on the rocks near St. Pauls Island in May last and went down shortly after striking. Owing to prompt and courageous action on the part of the men at the station eight men were rescued.

A statement of the life-boat stations will be found in supplement No. 1 to this report.

SIGNAL SERVICE.

The reports of the Superintendents of the Signal Service at Quebec and Halifax contain information for mariners. Mr. J. U. Gregory is superintendent of the service at Quebec, and Lieut. George Butler, superintendent of the service at Halifax.

Arrangements have been completed between the Government of Canada and the Society of Lloyds, whereby the following signal stations, maintained by the Dominion of Canada, have been included in Lloyds system of reporting stations. Orders forwarded to Lloyds, can be notified to vessels by means of these signal stations, on the same terms and conditions as observations at Lloyds signal stations and vessels signalling to these Canadian signal stations, will be reported to Lloyds for insertion in the Lloyds List and Shipping Gazette, and daily press, in the same manner as reports from Lloyds signal stations.

LIST OF STATIONS.

Belle Isle,	Chateau Bay,
Cape Ray, Newfoundland,	South-west Point, Anticosti,
St. Paul's Island, Cape Breton,	West Point,
Cape St. Lawrence,	Cape Rosier, Gaspé coast,
Heath Point, Anticosti,	Fame Point “
Amherst Island, Magdalen Islds.,	Cape Magdalen “
Point Amour, Forteau,	South Point “

The government telegraph system was, during the season of 1901, extended along the north coast of the Gulf of St. Lawrence to the strait of Belle Isle, and Belle Isle was connected by cable with the shore telegraph system.

SESSIONAL PAPER No. 21

Arrangements have been completed by the department whereby all inward bound vessels, showing their signal numbers, will be reported from marine signal stations in the river and Gulf of St. Lawrence immediately, and all reports will be promptly posted on the bulletin board of the Great North-western Telegraph Company's office in St. Peter Street, Quebec, and on that of the Board of Trade in Montreal.

Weather and ice reports will be forwarded twice a day, as formerly ; and similarly posted.

Arrangements have also been made for repeating all reports received to the pilot station at Father Point, so that pilots will be promptly advised of the locality of inward bound vessels.

A telegraph station was established by the government of Canada at the lighthouse at Point Amour, and included in the list of marine signal stations from which reports will be posted at Quebec and Montreal.

Wireless telegraph stations have been established by the Marconi Wireless Telegraph Company (Ltd.) at Belle Isle, Chateau bay, Cape Ray, Cape Race, Fame Point, Heath Point and Point Amour.

Blue lights have been supplied the signal stations at Belle Isle and Point Amour to indicate to any passing vessel sending up distinguishing rockets that their night signals were recognized and would in consequence be reported.

The reports of the superintendents will be found in an appendix to this report.

MERCHANT SHIPPING.

Reports relating to merchant shipping for the calendar year of 1904 have not been received from the registrars of shipping in various parts of the Dominion. The reports are made up to the end of the calendar year, as provided by the Canadian Shipping Act, and therefore, will not be received until some time after the month of January.

The statements showing the number of vessels in the registry books of the Dominion on December 31, 1904, will appear in supplement No. 1 of this report. The number of new vessels built and registered will also be shown, and a comparative statement of the tonnage of new vessels built and registered, from 1874 to 1904, both inclusive.

Mr. W. L. Magee, chief clerk, attends to all matters in connection with merchant shipping.

WIRELESS TELEGRAPHY AND SUBMARINE SIGNALLING.

These discoveries have, during the past year, received careful consideration by the officers of the department, and much has been done towards utilizing them in the interests of navigation. Details of the work accomplished are given in the respective reports of the Commander of the Canadian Marine Service and the Commissioner of Lights.

A personal inspection of the submarine signal system in operation between New York and Boston was made by the Minister, the undersigned and representatives of the Shipping Federation of Montreal. The demonstration given was very convincing and all present were satisfied of the great usefulness of this new aid.

DOMINION STEAMERS.

Particulars in regard to the description of the steamers and their operations during the past season will be found in appended report of the Commander of the Canadian

4-5 EDWARD VII., A. 1905

Marine Service. The names of the steamers actively employed during the past year were :—

<i>Minto,</i>	<i>Petrel,</i>	<i>Druid,</i>	<i>Constance,</i>
<i>Kingfisher,</i>	<i>Stanley,</i>	<i>Brant,</i>	<i>Lady Laurier,</i>
<i>Lansdowne,</i>	<i>Kestrel,</i>	<i>Quadra,</i>	<i>Scout,</i>
<i>Gulnare,</i>	<i>Bayfield,</i>	<i>La Canadienne,</i>	<i>Falcon,</i>
<i>Maisonneuve,</i>	<i>Frontenac,</i>	<i>Shamrock,</i>	<i>Reserve,</i>
<i>Aberdeen,</i>	<i>Osprey,</i>	<i>Curlew,</i>	

The names of the new steamers added to the fleet under the charge of this department are *Canada, Vigilant, Montcalm, Champlain.*

There is also in the service of the department the following steam tugs :—

<i>Champlain,</i>	<i>Swan,</i>	<i>De Levis,</i>	<i>St. Francis,</i>
<i>Montcalm,</i>	<i>James Howden,</i>	<i>Cartier,</i>	<i>Amelia,</i>
<i>Georgia,</i>	<i>Eureka,</i>	<i>Jessie Hume,</i>	<i>Lac St. Pierre.</i>
<i>Jean Iberville.</i>			

besides a number of dredges.

Cost of maintaining Dominion Steamers, Marine Branch, from 1884 to 1904.

Years.	Cost of Maintenance.	Years.	Cost of Maintenance.
	\$ c.		\$ c.
1883-84.	122,816 25	1894-95	129,899 80
1884-85.	148,864 26	1895-96.	150,519 41
1885-86.	130,759 83	1896-97.	136,940 11
1886-87.	141,424 42	1897-98.	117,644 39
1887-88.	150,659 19	1898-99.	145,270 75
1888-89.	126,629 33	1899-1900.	180,975 45
1889-90.	114,959 20	1900-1901.	195,484 75
1890-91.	111,437 03	1901-1902.	241,060 98
1891-92.	127,406 28	1902-1903.	279,348 06
1892-93.	146,521 77	1903-1904.	306,171 01
1893-94.	142,487 42		

STEAMBOAT INSPECTION.

The total number of steamboats reported in the several districts in the Dominion is 1,691, of this number 135 were added to the Dominion during the year, the gross tonnage being 295,062·82. Fees were collected for inspection amounting to \$9,698.78, the fees from engineers for certificates amounted to \$1,090 and fees for inspection of tow barges to \$30, making the total receipts from steamboat inspection and engineers' certificates \$10,818.78. The net receipts to the credit of the fund for the previous year amounted to \$28,889.09.

The total expenditure in connection with inspection was \$33,723.12. Increase of expenditure for the last fiscal year of \$3,551.03.

The consolidated laws relating to steamboat inspection came into force on the 1st day of January, 1899.

SESSIONAL PAPER No. 21

The report of the chairman of the Board of Steamboat Inspection forms Appendix No. 6.

The following is a comparative statement of the receipts and expenditures in connection with steamboat inspection :—

	Receipts.	Expenditure.
	\$ cts.	\$ cts.
For the fiscal year ended June 30, 1870.	12,521 29	7,379 18
" " 1871.	10,369 96	8,321 00
" " 1872.	11,710 43	8,500 00
" " 1873.	15,412 75	11,205 54
" " 1874.	15,603 19	10,291 58
" " 1875.	15,011 90	12,199 81
" " 1876.	13,811 24	13,081 86
" " 1877.	15,858 42	12,073 01
" " 1878.	12,431 25	13,228 28
" " 1879.	12,331 16	13,076 46
" " 1880.	15,424 02	11,854 34
" " 1881.	16,905 49	12,211 65
" " 1882.	15,277 78	14,835 97
" " 1883.	12,577 36	16,209 02
" " 1884.	15,371 79	21,893 28
" " 1885.	13,343 66	23,235 04
" " 1886.	14,087 76	21,775 57
" " 1887.	12,701 20	22,837 80
" " 1888.	12,550 14	21,430 45
" " 1889.	12,576 18	22,313 03
" " 1890.	19,859 18	20,989 52
" " 1891.	21,644 72	22,183 76
" " 1892.	20,994 84	22,736 59
" " 1893.	25,295 35	24,386 95
" " 1894.	24,835 47	25,961 36
" " 1895.	24,630 56	26,385 88
" " 1896.	24,002 32	26,321 27
" " 1897.	25,094 95	26,837 83
" " 1898.	31,525 40	26,342 29
" " 1899.	33,854 45	28,035 49
" " 1900.	36,474 83	27,965 92
" " 1901.	34,967 37	29,247 59
" " 1902.	38,458 92	27,493 80
" " 1903.	28,888 09	30,172 09
" " 1904.	10,818 78	33,723 12
	677,062 15	697,756 33

Owing to amendment of the Steamboat Inspection Act of 1898, whereby fees for inspection of Dominion registered steamers were abrogated there has been a falling off in receipts compared with those for the previous year, the fees as shown having been collected from steamers inspected but registered elsewhere than in Canada to the number of 131 having a gross tonnage of 101,477·36.

An Act to amend the Steamboat Inspection Act of 1898 was passed and assented to July 18, 1904 ; the following is a copy :—

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows :—

1. Subsection 1 of section 6 of The Steamboat Inspection Act, 1898, is amended by adding thereto the following paragraph :—

‘(g) for the inspection of the machinery and equipment of steamboats propelled by gas, fluid, naphtha, electricity, or any other mechanical or chemical power, and in case of such vessels for making such changes in forms A and B of the second schedule hereto as he deems advisable.’

Name.	Position.	Address.
Edward Adams.....	Chairman, Steamboat, Steamboat Inspection..	Ottawa.
M. P. McElhinney.....	Inspector of Hulls and Equipment.....	"
I. J. Olive.....	" " " " " " " " " " " "	St. John, N.B.
S. R. Hill.....	" " " " " " " " " " " "	Halifax, N.S.
William Evans.....	" " " " " " " " " " " "	Toronto, Ont.
M. R. Davis ..	" " " " " " " " " " " "	Kingston.
Philippe Duclos.....	" " " " " " " " " " " "	Quebec.
R. Collier.....	" " " " " " " " " " " "	Victoria, B.C.
John Dodds	Inspector of Boilers and Machinery.....	Toronto, Ont.
E. W. McKean.....	" " " " " " " " " " " "	"
J. B. Stewart.....	" " " " " " " " " " " "	"
T. P. Thompson.....	" " " " " " " " " " " "	Kingston, Ont.
Wm. Laurie.....	" " " " " " " " " " " "	Montreal, P.Q.
L. Arpin.....	" " " " " " " " " " " "	"
A. Rondeau.....	" " " " " " " " " " " "	Sorel.
J. Samson.....	" " " " " " " " " " " "	Quebec, P.Q.
J. P. Esdaile	" " " " " " " " " " " "	Halifax, N.S.
C. E. Dalton.....	" " " " " " " " " " " "	St. John, N.B.
J. A. Thomson.....	" " " " " " " " " " " "	Victoria, B.C.
G. P. Phillips.....	" " " " " " " " " " " "	Rat Portage, Ont.
Frank M. Richardson...	" " " " " " " " " " " "	Vancouver.
Douglas, Stevens.	Inspector of Dominion Steamers.....	Halifax.

COASTING TRADE OF CANADA.

By the provisions of chapter 83, Consolidated Statutes of Canada, being an Act respecting the Coasting Trade of Canada, no goods or passengers can be carried by water from one port in Canada to another except in British ships, but the Governor in Council may from time to time declare that the Act shall not apply to ships or vessels of any foreign country in which British ships are admitted to the coasting trade of such country, and to carry goods and passengers from one port or place to another in such country, the parliament of Canada was empowered to pass the Act alluded to under the provisions of the Imperial Act, 32 Vic., chapter 11, intituled ; ‘An Act to amend the law relating to the Coasting Trade and Merchant Shipping of British Possessions’ which came into operation in this country on its proclamation by the Governor General on October 23, 1869.

It was ascertained that the following countries, viz., Italy, Germany, and Netherlands, Sweden and Norway, Austria-Hungary, Denmark, Belgium and the Argentine Republic allowed British ships or vessels to participate in their coasting trade on the same footing as their own national vessels :—the ships of Italy, by Order in Council of August 13, 1873 ; those of Germany, by Order in Council of May 14, 1874 ; those of the Netherlands, by Order in Council of September 9, 1874 ; those of Sweden and Norway, by Order in Council of November 5, 1874 ; those of Austro-Hungary, by Order in Council of June 1, 1876 ; those of Denmark, by Order in Council of January 25, 1877 ; those of Belgium, by Order in Council of September 30, 1879 ; and those of Argentine Republic, by Order in Council of May 18, 1881, were admitted to the coasting trade of Canada.

SESSIONAL PAPER No. 21

The following Act, entitled an Act respecting the Coasting Trade of Canada, was assented to May 15, 1902, and relates to the payment of duty on foreign built British ships :—

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows :—

1. In this Act, unless the context otherwise requires, the expression 'British Ships' means and includes all ships belonging wholly to persons qualified or entitled to be owners of British ships, under the provisions of 'The Merchant Shipping Act, 1894,' any other Act of Parliament of the United Kingdom in that behalf, in force for the time being.

(2) For all purposes of this Act the expression 'the coasting trade of Canada' shall be deemed to include the carriage by water of goods or passengers from one port or place in Canada to another port or place in Canada.

2. No foreign-built British ship, whether registered in Canada or elsewhere, shall be entitled to engage or take part in the coasting trade of Canada, unless such foreign-built British ship has first obtained a license for that purpose, which may be granted by the Minister of Customs.

(2) The Minister of Customs shall issue such license to any foreign-built British ship, whether registered in Canada or elsewhere, upon application therefor and upon the payment of a duty of twenty-five per cent ad valorem on the fair market value of the hull, rigging, machinery, boilers, furniture and appurtenances of such ship.

(3) This section shall not apply to any foreign-built British ship registered as a British ship prior to the first day of September, 1902.

3. No goods or passengers shall be carried by water, from one port of Canada to another, except in British ships ; and if any goods or passengers are so carried, as aforesaid, contrary to this Act, the master of the ship or vessel so carrying them shall incur a penalty of four hundred dollars ; and any goods so carried shall be forfeited, as smuggled ; and such ship or vessel may be detained by the Collector of Customs, at any port or place to which such goods or passengers are brought, until such penalty is paid, or security for the payment thereof given to his satisfaction, and until such goods are delivered up to him, to be dealt with as goods forfeited under the provisions of the Customs Act.

4. The master of any steam vessel, not being a British ship, engaged, or having been engaged, in towing any ship, vessel or raft, from one port or place in Canada to another, except in case of distress, shall incur a penalty of four hundred dollars ; and such steam vessel may be detained by the Collector of Customs at any port or place to or in which such ship, vessel or raft is towed, until such penalty is paid.

5. Penalties and forfeitures under this Act may be recovered and enforced in the manner provided by The Customs Act, with respect to penalties and forfeitures incurred under it, and as if imposed by it ; and this Act shall accordingly be construed with reference to said Act, and as forming one Act with it, and all words and expressions in this Act shall have the same meaning as the like words and expressions in said Act.

4-5 EDWARD VII., A. 1905

6. The Governor in Council may, from time to time, declare that the foregoing provisions of this Act shall not apply to the ships or vessels of any foreign country in which British ships are admitted to the coasting trade of such country, and to carry goods and passengers from one port or place to another in such country.

7. Where by treaty made before the passing of 'The Merchant Shipping (Colonial) Act, 1869,' (that is to say before the thirteenth day of May, eighteen-hundred and sixty-nine), Her late Majesty, Queen Victoria, agreed to grant to any ships of any foreign state any rights or privileges in respect of the coasting trade of Canada, those rights and privileges shall be enjoyed by those ships for so long as Her late Majesty agreed, or His Majesty the King may hereafter agree, to grant them.

8. Chapter 83 of the Revised Statutes is repealed.

WINTER STEAMERS AND ROUTES.

During the season of 1903, an attempt was again made to have continuous winter communication between Summerside, P.E.I., and Tormentine, N.B., the steamer *Stanley* being placed upon the route on the 16th of December, and making return trips until the 28th. On that day, however, the ice became very heavy and so badly rafted in Summerside bay that it was impossible to keep up communication any longer on this route. The *Stanley* then entered upon the winter service between Georgetown, P.E.I., and Pictou, N.S., in conjunction with the D.G.S. *Minto* continuing on that route until the 20th April, when she made one trip to Charlottetown.

The *Minto* commenced the winter mail service on the 19th December, 1903, making tri-weekly trips between Charlottetown and Pictou until the 26th of December, when that route was abandoned and the Pictou-Georgetown route entered upon, continuing thereon until the 12th of April, 1904, and making tri-weekly trips with the D.G.S. *Stanley*. The *Minto* then returned to the Charlottetown-Pictou route until the 23rd April, when the Charlottetown Steam Navigation Company's steamers took up the service and the *Minto* was laid up.

PILOTAGE SYSTEM.

During the year the pilotage system between Montreal and Quebec came under the control of the department, a detailed report relative thereto is appended.

MARINE SCHOOLS.

The establishment of such schools has engaged the attention of the department and a report of the action, so far taken, forms an appendix to this report.

CERTIFICATES TO MASTERS AND MATES.

During the year ended 30th June, 1904, 57 candidates applied for examination as masters, mates or second mates in the foreign trade, and 8 failed—12 masters', 15 mates' and 22 second mates' foreign going certificates were issued; and 403 candidates applied for examination as masters or mates in the inland or coasting trade, and 39 failed—237 masters' and 127 mates' inland and coasting certificates were issued.

SESSIONAL PAPER No. 21

FOREIGN-GOING CERTIFICATES.

Examinations for foreign going certificates were held ; as follows :—

At Halifax, N.S., 4 applicants for masters' certificates, 7 for mates' certificates and 5 for second mates' certificates were examined, 1 applicant for a mate's certificate and 1 for a second mate's certificate failed.

At Yarmouth, N.S., 1 applicant for a master's certificate, 3 for mates' certificates and 3 for second mates' certificates were examined, 1 applicant for a mate's certificate and 1 for a second mate's certificate failed.

At St. John, N.B., 2 applicants for masters' certificates, 2 for mates' certificates and 3 for second mates' certificates were examined, 1 applicant for a mate's certificate, and 1 for a second mate's certificate failed.

At Victoria, B.C., 4 applicants for masters' certificates, 6 for mates' certificates and 16 for second mates' certificates were examined, 2 applicants for second mates' certificates failed.

At Ottawa, Ont., 1 applicant for a master's certificate was examined.

INLAND AND COASTING CERTIFICATES.

Examinations for inland and coasting certificates were held as follows :—

At Halifax, N.S., 9 applicants for masters' certificates and 6 for mates' certificates were examined, 1 applicant for a master's certificate failed.

At Yarmouth, N.S., 23 applicants for masters' certificates and 9 for mates' certificates were examined, one applicant for a master's certificate and 1 for a mate's certificate failed.

At Sydney, N.S., 20 applicants for masters' certificates and 5 for mates' certificates were examined, 4 applicants for masters' certificates failed.

At Lunenburg, N.S., 3 applicants for masters' certificates were examined, 1 applicant for a master's certificate failed.

At St. John, N.B., 21 applicants for masters' certificates and 4 for mates' certificates were examined, 1 applicant for a master's certificate failed.

At Charlottetown, P.E.I., 6 applicants for masters' certificates and 1 for a mate's certificate were examined, 1 applicant for a master's certificate failed.

At Quebec, P.Q., 22 applicants for masters' certificates and 18 for mates' certificates were examined, 4 applicants for masters' certificates and 2 for mates' certificates failed.

At Ottawa, Ont., 25 applicants for masters' certificates and 5 for mates' certificates were examined, 4 applicants for mates' certificates failed.

At Kingston, Ont., 20 applicants for masters' certificates and 19 for mates' certificates were examined, 1 applicant for a master's certificate failed.

At St. Catharines, Ont., 46 applicants for masters' certificates and 34 for mates' certificates were examined, 6 applicants for masters' certificates and 2 for mates' certificates failed.

4-5 EDWARD VII., A. 1905

At Rat Portage, Ont., 13 applicants for masters' certificates and 2 for mates' certificates were examined, 2 applicants for masters' certificates failed.

At Victoria, B.C., 15 applicants for masters' certificates and 7 for mates' certificates were examined, 3 applicants for masters' certificates failed.

At Vancouver, B.C., 26 applicants for masters' certificates and 22 for mates' certificates were examined, 2 applicants for masters' certificates and 2 for mates' certificates failed.

At Arrowhead, B.C., 3 applicants for masters' certificates and 4 for mates' certificates were examined, 1 applicant for a mate's certificate failed.

Fifteen (15) persons applied to collectors of customs for certificates as masters of tug boats.

The total amount collected in fees from applicants for certificates during the fiscal year ended June 30, 1904, was \$4,795, and the amount expended on account of this service was \$7,761.17, an excess of expenditure over receipts of \$2,966.17.

The vote for this service was \$8,000, leaving an unexpended balance of \$238.83.

The following statement shows the total receipts and expenditure on account of masters and mates since 1871 :—

		Expendi- ture.	Receipts.			Expendi- ture.	Receipts.
		\$ cts.	\$ cts.			\$ cts.	\$ cts.
For the fiscal year ended June 30, 1871.		1,410 45		For the fiscal year ended June 30, 1891.		4,255 24	2,586 00
"	" 1872.	4,312 07	1,344 00	"	" 1892.	4,363 88	2,194 00
"	" 1873.	6,466 18	4,963 00	"	" 1893.	4,116 99	2,484 00
"	" 1874.	4,520 19	2,995 00	"	" 1894.	3,721 33	2,907 04
"	" 1875.	5,696 62	2,715 00	"	" 1895.	3,758 29	3,974 50
"	" 1876.	4,672 08	2,021 87	"	" 1896.	4,062 82	2,307 50
"	" 1877.	4,050 00	1,740 50	"	" 1897.	3,536 29	3,754 00
"	" 1878.	4,249 76	1,296 50	"	" 1898.	3,335 40	4,800 00
"	" 1879.	4,250 12	1,334 50	"	" 1899.	3,568 26	4,486 50
"	" 1880.	4,253 43	1,547 00	"	" 1900.	3,750 69	4,221 50
"	" 1881.	3,888 41	1,333 50	"	" 1901.	3,720 25	4,808 24
"	" 1882.	3,965 19	1,152 50	"	" 1902.	3,305 59	5,288 52
"	" 1883.	4,021 20	1,314 00	"	" 1903.	4,968 36	5,790 50
"	" 1884.	3,909 59	9,437 50	"	" 1904.	7,761 17	4,795 00
"	" 1885.	4,324 15	2,897 00				
"	" 1886.	5,245 28	2,152 00	Expenditure	145,885 09	102,421 97	
"	" 1887.	4,855 98	2,172 00	Receipts	102,421 97		
"	" 1888.	5,060 96	3,220 80				
"	" 1889.	4,381 04	2,202 00	Excess of expenditure over receipts	43,463 12		
"	" 1890.	4,117 83	2,186 00				

ICE-BOAT SERVICE BETWEEN CAPES TRAVERSE AND TORMENTINE.

This service was opened on January 21 and closed on March 31, 1904.

In January, there were twelve strap passengers and two hauled, 15,360 lbs. mail carried. Gross earnings, \$32.

In February, there were twenty-one strap passengers and seven hauled, 226 lbs excess passenger baggage, 41,530 lbs. mails Gross earnings, \$78.78.

SESSIONAL PAPER No. 21

In March, twelve strap passengers, 5,660 lbs. mails. Gross earnings, \$24.
The gross earnings of all the boats amounted to \$134.78.

RECAPITULATION.

Month.	Strap Passengers.	Hauled Passengers.	Mails.	Gross Earnings.
1904.			Lbs.	\$ cts.
January	12	2	15,360	32 00
February	*21	7	41,530	78 78
March	12	....	5,660	24 00
Total.....	45	9	62,550	134 78

* Having an excess baggage of 226 lbs.

REMOVAL OF OBSTRUCTIONS TO NAVIGATION.

The amount granted by parliament last session for the removal of obstructions to navigation was \$1,000. Of this amount \$752.60 was expended during the fiscal year.
A statement in detail of the work accomplished in removing obstructions will be found in the report of the Chief Engineer.

SICK AND DISTRESSED MARINERS.

MARINE HOSPITALS.

Under the provisions of Chapter 76, Revised Statutes, dues of two cents per ton register is levied on every vessel arriving in any port of the province of Quebec, Nova Scotia, New Brunswick, Prince Edward Island and British Columbia, the money thus collected forming the Sick Mariners' Fund. Vessels of the burden of 100 tons and less pay the duty once in each calendar year, and vessels of more than 100 tons, three times in each year.
By an amendment of this Act, passed at the session of parliament in 1887, 50-51 Victoria, Chapter 40, it is provided that no vessel, not registered in Canada and which is employed exclusively in fishing or on a fishing voyage, shall be subject to the payment of this duty.
The receipts for the fiscal year ended June 30 last, amounted to \$61,778.29, being a decrease of \$3,073.26 as compared with the preceding year. The increase and decrease in receipts for sick mariners' dues in the various provinces were as follows : —Nova Scotia, decrease, \$3,028.78 ; New Brunswick, increase, \$763.82 ; Quebec, increase, \$902.58 ; Prince Edward Island, decrease, \$18.26 ; British Columbia, decrease, \$1,381.28.
The Sick Mariners' Act does not apply to the province of Ontario, and consequently no dues are collected from vessels in that province, although a small expenditure is incurred on account of sick seamen. An appropriation is made by parliament to cover

4-5 EDWARD VII., A. 1905

the expenditure at Kingston and St. Catharines, where general hospitals have been established, and sick seamen were paid for at a per diem rate of 90c.

In the province of Quebec the expenditure on account of sick seamen amounted to \$8,683.70, being \$83.67 more than the previous year. The total collections for the entire province amounted to \$19,134.56, being \$902.58 more than in the previous year.

At the port of Montreal, sick seamen are cared for at the General Hospital and at Notre Dame Hospital, under an arrangement made by the department, by which 90 cents per diem is paid for board and medical attendance of each seaman. The sick mariners' dues collected at the port of Montreal, during the fiscal year ended June 30th last, amounted to \$8,443.92.

At the port of Quebec, sick seamen are cared for at the Jeffery Hale and the Hotel Dieu Hospitals, the sum of 90 cents per diem for each seaman is allowed for medical attendance and board. The sick mariners' dues collected at Quebec, amounted to \$8,101.68.

The expenditure on account of sick seamen in the province of New Brunswick for the fiscal year, amounted to \$4,688.35, being \$1,930.79 less than the preceding year, and the collection of dues to \$11,938.38, or \$763.82 more than the previous year. Marine Hospitals have been maintained at Miramichi, Richibucto and Bathurst.

In the province of Nova Scotia, marine hospitals are maintained at the ports of Yarmouth, Pictou, Sydney, Lunenburg and Point Tupper. The total expenditure on account of sick seamen in the province of Nova Scotia for the fiscal year amounted to \$26,380.09 and the receipts to \$19,544.57.

At Halifax provision is made for the care of sick seamen at the Victoria General Hospital, under arrangements made with the managers by which the sum of 90 cents per diem is allowed for board and medical attendance.

In the province of Prince Edward Island, the sum expended on account of sick seamen, during the fiscal year, was \$2,561.37 and the receipts from sick mariners' dues \$431.78.

Sick seamen are cared for at the Charlottetown and Prince Edward Island Hospitals, under arrangements made with the managers of these institutions, at the same rate as is paid to the public hospitals in other parts of the Dominion.

In the province of British Columbia, the sum of \$7,422.54 was expended for sick and disabled seamen, while the receipts from the collection of sick mariners' dues amounted to \$11,193.94.

The Marine Hospital at Victoria has in attendance a medical superintendent with a salary of \$300 per annum, and a keeper whose salary is \$500 per annum. He is also allowed a rate of \$5 a week for board and attendance of each seaman.

At the ports where no hospitals are established, in the province of Quebec, Nova Scotia, New Brunswick, British Columbia and Prince Edward Island, sick seamen are cared for under the chief officer of Customs, when the vessel to which the seamen belong has paid the dues according to law. A circular to collectors of customs was issued February 7th, 1891, permitting sick seamen to be attended at the port of arrival of a vessel, provided that the regular dues were previously paid at some port.

SESSIONAL PAPER No. 21

During the fiscal year the sum of \$515.10 was expended for shipwrecked and distressed seamen, for which there was a parliamentary appropriation of \$3,000.

The total expenditure on account of sick seamen and marine hospitals, amounted to \$49,786.68 and the appropriation of parliament for this service was \$50,000. The dues collected amounted to \$61,778.29.

The receipts and expenditure in connection with sick and distressed seamen from the year 1869 were as follows:—

	Receipts.	Expenditure.
	\$ c.	\$ c.
For the fiscal year ended June 30, 1869..	31,353 78	26,987 64
" " 1870	31,410 46	27,029 34
" " 1871	29,683 41	28,971 22
" " 1872	34,911 64	34,947 60
" " 1873	37,136 10	41,016 43
" " 1874	41,500 16	59,778 90
" " 1875	37,801 46	50,684 76
" " 1876	41,287 66	48,828 49
" " 1877	43,739 21	51,647 94
" " 1878	44,665 07	43,780 90
" " 1879	37,779 57	42,729 36
" " 1880	42,523 20	42,160 91
" " 1881	49,779 72	40,667 52
" " 1882	45,951 47	39,359 11
" " 1883	45,573 42	36,249 65
" " 1884	48,667 07	39,553 58
" " 1885	39,068 39	44,501 57
" " 1886	40,848 05	50,377 62
" " 1887	42,334 92	37,447 35
" " 1888	41,669 64	36,447 85
" " 1889	39,306 29	41,320 59
" " 1890	47,881 75	41,729 11
" " 1891	43,829 68	35,155 12
" " 1892	45,381 92	33,498 83
" " 1893	46,190 69	35,052 37
" " 1894	49,105 40	38,403 94
" " 1895	42,815 74	38,332 55
" " 1896	45,751 61	36,683 36
" " 1897	54,358 10	35,931 19
" " 1898	54,552 81	34,526 83
" " 1899	57,365 79	37,353 29
" " 1900	59,971 84	32,743 30
" " 1901	59,783 34	34,944 93
" " 1902	65,853 83	51,827 12
" " 1903	64,851 55	48,151 48
" " 1904	61,778 29	50,301 78
Total	1,646,463 03	1,457,129 33

OIL FOR USE OF LIGHTHOUSES.

The department entered into a contract with the Canadian Economic Lubricating Company (Ltd.) of Montreal, for supplying lighthouse oil for the season of 1904.

The specification upon which the contract was based required the oil to weigh at 62° Fahr., not less than 7.85 lb. nor more than 8 lb. per gallon and to withstand a flash test of 115° Fahr.

4-5 EDWARD VII., A. 1905

A quantity of oil was also purchased from the Standard Oil Company, of New York, for use in the dioptric lights. The oil supplied by the Standard Oil Company was made according to a specification prepared by the American Lighthouse Board.

The quantity of oil supplied lights above Montreal during the season of 1904, was 11,754.80 gallons, imperial measure; to the lights in the Quebec district 14,752.60 gallons; to the lights in the Nova Scotia district 50,700 gallons; to the lights in the New Brunswick district 7,502 gallons; to the lights in the Prince Edward Island district 6,672 gallons; and to the lights in the British Columbia district 7,139 gallons.

METEOROLOGICAL SERVICE.

Six new stations were established in British Columbia, eight in the North-west Territories and eleven in Manitoba.

There are now 340 stations in the Dominion, Newfoundland and Bermuda using instruments supplied by the Canadian government. At 237 stations, the observations are taken voluntarily, sending regular monthly returns to the central office. At 64 stations lying chiefly in the far northern territories of Canada, and at lighthouses in the Gulf of St. Lawrence, small gratuities are allowed observers. At 39 stations distributed at nearly equal intervals throughout the Dominion, three or more observations are taken daily, and the observers are paid salaries. From 34 of these stations two reports each day are telegraphed to Toronto, to be used in the preparation of the daily weather chart.

Climatological reports are published, each report containing a meteorological summary from nearly 350 stations. An annual meteorological summary is also published for Toronto, a monthly weather review for the Dominion and a monthly weather chart.

Forecasts are of the greatest interest to the public and are now issued for all parts of the Dominion, and storm signals have been hoisted at nearly every port, both on the seaboard and on the Great Lakes.

While forecasts and storm warnings, working on fairly established lines are given every attention, research work and investigation of magnetic changes and meteorological phenomena are steadily pursued.

The forecasts and storm warnings have been maintained during the year and 1,305 warnings from Toronto sent, and of these 1105 or 84.7 per cent were verified. The storm warnings are appreciated by mariners and the forecasts of weather have been considered valuable by forwarders.

Seismological observations have been made by keeping in operation the seismographs in Toronto and Victoria. The work in connection with the magnetic observatory at Toronto, as well as the other operations of the meteorological service, are recorded in detail in the report of Mr. R. F. Stupart appended hereto.

HUDSON BAY EXPEDITION.

During 1903-04 an expedition under command of Mr. A. P. Low was sent to Hudson Bay and the Arctic islands. Mr. Low's preliminary report is hereto attached.

SESSIONAL PAPER No. 21

LIVE STOCK SHIPMENTS.

The report of Messrs. Pope and Delorme shows that the total number of cattle shipped from the port of Montreal to Europe, for the year 1904, was 112,611, sheep 48,075 and 315 horses

From St. John, N.B., 25,855 cattle, 23,428 sheep and 31 horses.

From Halifax, 5,456 cattle, 1,475 sheep and 30 horses.

From Charlottetown, 33 cattle and 3,771 sheep.

From Quebec, 100 cattle.

Total from these ports for European ports, 144,055 cattle, 76,749 sheep and 376 horses.

The shipments in detail will be found in Appendix No. 21 of this report.

OUTSIDE SERVICE, MARINE BRANCH.

In addition to the staff at Ottawa there is an outside service, under the jurisdiction of the department, numbering about 2,000. It consists of the Agents and their respective staffs: Superintendents of Lights; Lightkeepers throughout the Dominion; Officers and crews of Dominion Steamers and vessels including the Fisheries Protection Service; Coxswains of life-boats; Inspectors of steamboats; Inspectors of shipment of live stock; Examiners of masters and mates; Officers and servants in Marine hospitals; Shipping masters; Harbour masters; Meteorological observers; Officers of observatories; Hydrographers and civil engineers their assistants and machinists; Receivers of wreck; Wharfingers; Attendants at Humane Establishments, also messengers employed in the several agencies and in the Meteorological Office at Toronto.

Besides the above mentioned there are seventy-six registrars of shipping who act under the direction and control of this department but are at the same time collectors of customs at the various ports of registration but receive no fees in their capacity of registrars. There are ninety-five measuring surveyors of shipping throughout the Dominion who act as officers of this department and are remunerated from their fees of office although in addition to such fees many of them hold positions in the Customs Service. Also in addition to the above, by Orders in Council, of April 21 and December 2, 1874, the Chief Officer of Customs at each port in the provinces of Quebec, Nova Scotia, New Brunswick, British Columbia, and Prince Edward Island where no separate shipping office has been established is to be held and deemed a shipping master, is to receive the fees, make yearly returns to the department and act in that capacity under its directions.

CORRESPONDENCE.

28,706 letters, and a large number of telegrams were received in the department during the fiscal year and action taken thereon as far as necessary, entailing over 16,000 letters being mailed in reply. This correspondence is independent of forms, reports, circulars and notices inviting tenders addressed to the department or sent out. The forms, &c., alluded to, are very numerous and require special attention owing to the importance of the matters to which they refer.

4-5 EDWARD VII., A. 1905

The system adopted by the Records Branch of the department has been so perfected that there is no difficulty in, at once, knowing what action has been taken on any subject. The communications received, after being carefully examined, and entered in the Record Books are placed on their respective files with a copy of the reply sent to each communication attached, so that any file can be at any moment obtained showing, at a glance, the letters and the action of the department.

There has been an increase in the number of letters received this year compared with that of the preceding twelve months of 4,950 and of communications sent out of 1,245.

LEGISLATION.

During the session of 1904, the following Acts, relating to this department, were passed and assented to:—

An Act to amend the Act respecting the Navigation of Canadian Waters.

An Act to amend the Steamboat Inspection Act, 1898.

An Act to amend the Pilotage Act.

An Act to amend the Shipping Casualties Act, 1901.

In closing my report I avail myself of the opportunity to bear testimony to the faithful and efficient manner in which the members of the staff under me, have performed their respective duties.

I have the honour to be, sir,

Your obedient servant,

F. GOURDEAU, Lt.-Col.,
Deputy Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,

OTTAWA, January, 1905.

APPENDIX No. I

ANNUAL REPORT OF THE CHIEF ENGINEER OF THE DEPARTMENT
OF MARINE AND FISHERIES

The Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit a report of the work done in the several services under the supervision of this office during the twelve months ended November 30, 1904.

This embraces most of the technical work at departmental headquarters, including the construction of lighthouses, lightships, fog-alarms, buoys and beacons; the supervision of construction and repairs of lifeboats; the administration of the vote for the removal of wrecks and obstructions in navigable waters; tidal and current surveys; hydrographic surveys, and the publication, examination and correction of hydrographic charts; construction of and repairs to fish hatcheries and refrigerators; engineering points in connection with the construction and maintenance of fish-passes; supervision of surveys of oyster beds; examination of applications for foreshore, wharf and water lots as they affect the interests of navigation: preparation and publication of notices to mariners and hydrographic notes, &c.

There are special staffs appointed for the tidal observation work and for the hydrographic survey work; the remainder of the work of the branch is attended to by the general staff of the office.

STAFF.

My absence in England during the past summer, and the very great increase in the amount of constructive work undertaken by the department, combined to increase the work of my office staff, and I wish here to bear testimony to the satisfactory way in which all responded to the additional calls on their abilities, and specially to mention the executive skill and energy displayed by Mr. B. H. Fraser, who was in charge of the branch during my absence, in carrying out the minister's wishes; and in installing new fog alarm machinery, of which he has made a special study.

Many of the staff were sent out on work to oversee construction; Mr. O'Hanly to stations on the Ottawa river; Mr. H. E. Fosbery to fog alarm Stations in the Maritime Provinces, where he has been put in charge of special structural work; Mr. J. F. Murphy to stations on the great lakes; Mr. F. J. Alexander on special jobs; Mr. E. C. Larose to the Louisburg marine hospital and Montreal agency offices; and Mr. J. G. Roberts on special inspection. In the staff of my office all those employed last year were continued at work, except that Mr. W. B. Lindsay left this department in July, to accept a commission in the Canadian Engineers, and Mr. J. A. Légère in March on receiving a more lucrative appointment in the Department of Public Works.

The following new appointments have been made: Mr. J. H. Dubuc was appointed on the 1st August, 1904, as a draughtsman at a salary of \$900 per annum; Mr. E. Normandeau, appointed at the same time and rate, left the department on 10th October to take a more lucrative position; Mr. J. D. Lavergne, appointed on the 15th July at \$600, was on 20th October transferred to another branch of the department; Mr. L. E. Morin was employed temporarily at \$50 per month from 19th July to 20th September; Mr. E. Baleté appointed on 15th July at \$2.50 per day has been transferred to outside work; and Mr. L. Côté, appointed at \$1,200 per annum, is employed as superintendent of construction of fog alarm buildings in the gulf. Besides these, who

were regularly appointed to the office staff Mr. F. Forster, Mr. W. K. Morris, Mr. L. Keller and Mr. W. A. Archer were temporarily employed as foremen of works and Messrs. M. Egan and W. H. Brunel are now acting in that capacity, the latter at a salary of \$100 per month, on the construction of new fog alarm stations on the upper lakes, and on other constructive work.

OFFICE WORK.

A large proportion of the work done by the general staff of the branch consists in the construction, repair or improvement of light buildings, fog alarms, buoys, beacons and other aids to navigation. Full details of the work done in this connection during the past twelve months are contained in a separate report which is attached hereto. (Inclosure A).

Plans and specifications for all important new buildings and repairs, new vessels, buoys, &c., are made or approved in this office.

The following table indicates the work done in the draughting office during the twelve months ending November 30, 1904 :—

Description of work.	Plans designed.	Plans received.	Copies made.
Lighthouse towers and dwellings.....	30	4	131
Fog alarm buildings.....	5	...	26
Details	19	32	65
Wharfs, piers, &c	2	.....	24
Outbuildings.....	.....	.....	10
Buoys and apparatus.....	5	1	38
Machinery.....	9	63	45
Lanterns and illuminating apparatus.....	2	13	2
Marine hospital.....	1	.....	.....
Lightship .....	.....	1	.....
Steamers.....	1	1	17
Land surveys.....	.....	32	55
Miscellaneous.....	10	78	65
Plans relating to foreshore .....	.....	103	11
Totals..	84	328	489
Total plans for twelve months from December 1, 1903, to November 30, 1904			901
Charts received and recorded.....			156
" entered in chart book			31
Photographs received and recorded.....			75
Specifications written.....			31
Notices to mariners issued (comprising 337 subjects).....			128

PUBLICATIONS.

The work of preparing and issuing notices to mariners continues to be heavy and urgent, during the past twelve months 128 notices, covering 337 subjects, having been published. Amongst important notices, involving considerable labour in compilation, and representing useful work done in the department, are :—

An index to last year's notices ; revised sailing directions for Lake Superior, written by Mr. Stewart ; a list of the buoys in the River St. Lawrence from Quebec to the sea, prepared by the undersigned ; a description of the currents off the coast of Newfoundland, prepared by Dr. Dawson and several notices concerning improvements made in the ship channel between Quebec and Sorel, to fit it for night navigation.

In the preparation of notices to mariners, I wish to mention the faithful and exact work done by Mr. J. M. O'Hanly, who assists in this branch of the routine work.

SESSIONAL PAPER No. 21

During the past twelve months notices relating to waters outside of Canada were issued, covering 12 items relating to Newfoundland and the French islands, 4 items relating to the Atlantic, 36 to the inland, and 18 to the Pacific waters of the United States, as well as 33 notices referring to transatlantic, and 13 to transpacific, subjects. No attempt is made to issue a complete synopsis of British or foreign notices, but merely to republish items likely to be of immediate interest to Canadian vessels, or to vessels leaving Canadian ports for the more important or frequented foreign ports.

The annual edition of the list of lights and fog signals in Canada, corrected to April 1, 1904, was issued on June 1 ; special partial extracts, covering the great lakes and the Pacific coast respectively, also being published, as usual.

The lists of buoys in the River St. Lawrence below Quebec, and on the Pacific coast, referred to in last year's report as in preparation, were published soon after that item was written, and have met with general approval.

REMOVAL OF OBSTRUCTIONS.

During the past twelve months the following work was done under the annual appropriation for the removal of wrecks and obstructions :—

A stone and anchor lying in the approach to Hopewell wharf were removed by the harbour master. The cost was defrayed by selling the anchor, but a claim to the anchor has been made which, if allowed, will throw some small expense upon the department.

The sum of \$21.50 was paid to Capt. C. W. Brannen for removing 34 old logs and snags from the channel of the St. John River.

The steamer *Admiral* ran against the end of the wharf at New Carlisle and left some wreckage containing iron bolts in it, under the wharf, in a position where it was dangerous to other vessels. This wreckage was removed at a cost of \$60, and steps are being taken to recover this amount from the owners of the *Admiral*.

On October 4, 1904, the same steamer, owned by the North American Transportation Company, Ltd., of Quebec, took fire in Montreal harbour and sank opposite section 27 of the harbour. The owners have been notified to remove the wreck, but have failed to do so. This department is, accordingly, proceeding to have the wreck removed, and will claim the cost from the owners.

The yacht *Royal Clair*, sunk in Port Stanley harbour was, last autumn, towed out into the lake and was sunk close to the shore on the east side of the east pier, at a cost of \$20.

On November 18, 1903, the steamer *Minnesota*, owned in Cleveland, Ohio, when loaded with coal, caught fire, burned to the water's edge and then sank in the St. Clair river, below Russell island, directly on the sailing range of a pair of United States range lights. As the position of the wreck was in Canadian waters this department was asked to undertake the removal. A contract was let to the Reid Wrecking Company, of Sarnia, to do the work, which was completed under the inspection of Lieut.-Col. Charles E. G. B. Davis, Corps of Engineers, U.S.A., who kindly assisted this department. The wreck was removed to a least depth of 24 feet ; the contract price being \$8,450.

The Harbour Master of Vancouver reported that piles had been driven by the Pacific Coast Lumber Company in Coal harbour, between Stanley park and Deadman island. The company were notified to remove these piles, but failing to do so the matter was placed in the hands of the Department of Justice and proceedings were begun against the Company. The piles having later been removed, these proceedings were discontinued, but legal expenses, amounting to \$40.74, were incurred in connection with this case.

BUOYAGE.

A list of the ship channel buoys in the River St. Lawrence below Quebec, compiled by the undersigned, was published in January, 1904, this completing lists of all buoys in the ship channel from the gulf to Montreal. It is very desirable that complete lists of the buoys in the Dominion should be published, but, as explained in previous reports,

4-5 EDWARD VII., A. 1905

the preparation of such lists, with the system now in vogue, of having local authorities maintain unimportant buoys, is well nigh hopeless. The lists of River St. Lawrence and British Columbia buoys already published have met with the approval of mariners, and facilitate the official regulation of the service.

The work of substituting iron for wooden buoys has been completed, resulting in a great improvement in the service, and the shapes of all hollow buoys have been made to conform to International regulations.

A number of unlighted buoys have been replaced by gas buoys in the St. Lawrence ship channel, extending the portion lighted at night from Quebec to Three Rivers.

A list showing the number of buoys now maintained in Dominion waters is appended hereto (Inclosure B)

HYDROGRAPHIC WORK.

Since last year this department has assumed control of the hydrographic resurvey of the ship channel, heretofore in charge of Mr. P. E. Parent under the Department of Public Works, and of the hydrographic survey of Lake St. Louis, begun by the Department of Railways and Canals, and Mr. W. J. Stewart, who has heretofore been in charge of the hydrographic survey of the great lakes, has been put in charge of all hydrographic surveys. I understand he will make a special report on the hydrographic surveys now going on, and therefore it is not necessary for me to enlarge on this branch of our work. I may mention, however, that Mr. Stewart personally took charge, as usual, of the hydrographic resurvey of the Canadian shore of Lake Superior, on the steamer *Bayfield*, and made fair progress. In January, 1904, we published, as a notice to mariners, revised sailing directions for those portions of the lake resurveyed up to that date; in April, the Admiralty published a sheet chart of the eastern end of the lake, taking in the coast from Coppermine point to Cape Gargantua, embodying the work done in 1902 by Mr. Stewart; in June this department reproduced by photo-lithography Mr. Stewart's chart of the channel between Fort William and Pigeon bay, made in 1903. This is intended only as a preliminary chart, to be replaced, when the work is completed, by the regularly engraved Admiralty chart; in June the Admiralty issued a sheet chart of the eastern part of Lake Huron, taking in the coast from St. Clair river to Goderich, embodying the results of Mr. Stewart's resurvey of 1901.

Mr. F. Anderson was engaged this year in completing the hydrographic survey of Lake Winnipeg, using the chartered tug *Frank Burton*. In July, 1904, this department published a chart of that portion of the lake extending from Berens river northward to Nelson river, embodying the results of Mr. Anderson's work in 1902 and 1903; his work this year was for the purpose of adding detail and corrections to that chart.

For the purpose of accurately locating the channel in the Ottawa river, north of Way shoal, so as to correctly place range lights promised to mariners to lead through that channel, I found it necessary to make a small hydrographic survey of about 7 miles of the river at that point. This work was done in October, 1904, and proved that the channel heretofore used and the channel in which dredging was then being done was not the best track available for steamers. It also shows the necessity for making accurate surveys before dredging is begun or range lights located.

In preparing notices to mariners special attention has been paid to publishing all information obtainable respecting the hydrography of Canada, and the fullest possible sailing directions have been appended to all descriptions of aids to navigation, so as to increase the value of these notices. During the past twelve months the following hydrographic notes were published:

Affecting the Atlantic coast.—Mariners warned to avoid the current survey steamer off the mouth of the Bay of Fundy; an explanation of the several names of Port Lorne, from information received from Dr. Mackay, Halifax; correction of a British Admiralty notice to mariners stating that Lurcher whistling buoy had been withdrawn; uncharted rock marked by buoy in Indian harbour, Halifax county; time signal at Halifax described, from a report by the Director of the meteorological service; boats warned of

SESSIONAL PAPER No. 21

the danger zone at McNab island rifle range ; correction of the orthography of the name Crichton, from the records of the Geographic board.

Gulf and River St. Lawrence.—Uncharted rock reported off Arisaig, N.S., by Capt. P.C. Johnson, D.G.S. *Lady Laurier* ; additions to the St. Lawrence pilot, describing the telegraphic connections with and on the Magdalen islands, by the undersigned ; the geographical positions of all lights between Portneuf and Three Rivers defined by Mr. P. E. Parent, in charge of the hydrographic resurvey of the river : description of the placing in the river near Sorel of an electrical device for guiding vessels in narrow channels, by Profs. Herdt & Owen, McGill university ; completion of the 30-foot channel between Sorel and Longue Pointe announced from information from P.W.D.

Inland Waters.—Caution respecting the west gap, Toronto, by the Harbour master ; warning of the danger from the new east breakwater at Port Colborne, from Louis Coste, Esq., Resident Engineer ; hydrographical notes respecting Kensington point, St. Joseph channel, by the undersigned ; the position of Outer Pancake shoal, fixed by W. J. Stewart, Esq., Hydrographical Surveyor.

Pacific Coast.—Note respecting omission of rock in Uchucklesit harbour from charts, by British Admiralty :

Commander J. F. Parry, R.N., H.M.S. *Egeria*, in charge of the resurvey of B.C. waters, has kindly sent us valuable hydrographical notes describing dangers found in the course of his work, as follows : an uncharted rock in Telegraph harbour ; an uncharted rock off Atkins reef, Trincomali channel ; rocks found in and hydrographical information respecting Ladysmith : rocks found in and hydrographical notes respecting Active pass ; shoals located in and hydrographical notes relating to the approaches to Nanaimo harbour and Departure bay ; a shoal at the entrance to Nanoose harbour described, and another new patch found ; an uncharted rock in Ballinac channel ; an uncharted shoal off the south Ballinac island ; Sun rock in Queen Charlotte sound unsuccessfully sought for, and consequently removed from the charts ; and an uncharted rock located in Blunden harbour.

The department is indebted to Capt. J. T. Walbran for further particulars respecting the uncharted rock off Sidney ; to Captain A. J. Bjerre, of the steamer *Active* for the report of an uncharted rock in Malaspina strait ; to G. A. Keefer, Esq., resident engineer, P.W.D., for a description of the new wharf in Hardy bay ; and to Captain Hughes, of the ss. *Tees* for the description of an uncharted rock in Observatory inlet.

Notice was given of the change of the name of a lightstation on Kootenay lake from Balfour to Procter.

TIDAL AND CURRENT SURVEY.

The investigation of the currents has been continued throughout the summer season ; the D.G.S. *Gulnare* belonging to this Survey being employed for the purpose. The region chosen for examination was at the mouth of the Bay of Fundy, extending from Grand Manan island to Cape Sable. Dr. W. B. Dawson, the engineer in charge of the Survey, gave his personal supervision to this work from May to September ; and as the behaviour of the currents is here in marked contrast to those examined during the previous season on the coast of Newfoundland, a corresponding modification of methods and appliances was necessary.

This region is of the first importance to navigation, as it includes waters that lie on the line of steamers from United States ports which round the southern end of Nova Scotia on their way to Europe, as well as the lines of ocean steamers running to St. John, N.B. This is the first time that the currents on these routes have been systematically investigated with modern appliances. These outer waters are also of more importance to navigation than the tidal streams in the more restricted part of the Bay of Fundy, where they run parallel to the shores ; as in this region the currents are crossed more obliquely and have thus a greater tendency to set a vessel out of its course. There is also more fog in this region than within the bay.

4-5 EDWARD VII., A. 1905

The steamer was anchored at various points in the offing of the coasts indicated, in depths which ranged to 100 fathoms. The anchorages were chosen carefully with reference to the steamship routes, and far enough from shore to avoid disturbance from merely local conditions. The speed of the currents was obtained by current meters registering electrically; and their direction was noted every half hour, day and night. The observations also include the undercurrent, the temperature of the water and the mileage and direction of the wind. Notes of the current at the new lightship on the Lurcher shoal were also made throughout the season. Simultaneously, records of the tide were obtained on the self-registering gauges at Yarmouth and St. John, N.B. This affords direct comparison with the set of the currents; and as these are strong and regular and chiefly tidal in character, there is good hope of bringing them into relation with the tide tables. The time at which they turn in direction, as well as their strength, can thus be tabulated or charted.

In the tidal branch of the survey, the principal tidal stations in eastern Canada and Labrador have continued in operation throughout the year without any serious interruption. The improvement of most importance is the installation of a new tide gauge at Father point on the wharf now under construction. This will afford a better tidal record than it has been possible to obtain from the present gauge, which was built to act by siphoning; although the results have been supplemented by a large amount of technical work to obtain a satisfactory reduction of the record. The benefit to navigation on the St. Lawrence is important, as the tides and currents throughout the open estuary are referred to Father point as their port of reference.

The datum or plane of reference for the height of the tide in the new series of observations at Father point is maintained at the same level as before, in relation to the permanent bench mark established there. At St. John, N.B., Halifax and Yarmouth, the levels were again taken this summer to enable the observations to be reduced to one uniform datum.

A new bench mark was cut on the post office building at Yarmouth, to record permanently the tide levels there. With the constant attention given to this matter, there is no error exceeding one-eighth of an inch which finds its way into the tide levels as reduced, from year to year. The further observations obtained during the summer of 1903 at Charlottetown and Pictou, have afforded better values for extreme high and low water at those ports. Such levels are of immediate use for bridge and wharf construction, or dredging operations, in those harbours.

On the Pacific coast, tidal observations have been continued at Sand Heads in the Strait of Georgia, and at Port Simpson. Some sixteen months of tidal record has now been secured at Bamfield in Barkley sound, on the outer coast of Vancouver Island. A further year of observations at Victoria was secured and submitted to analysis, which will afford an improved basis for the tide tables for that port; as this year is at the opposite phase of the lunar cycle of 19 years, from the observations previously obtained. From a preliminary reduction of the observations at Bamfield and Port Simpson, those tides have been referred to the United States ports of Astoria and Sitka. An endeavour is being made, however, to obtain sufficient tidal record, at Port Simpson, to place it on an independent basis.

All new information from the summer tidal stations is now embodied in the tide tables, as well as the result of a short record obtained at Alert Bay in Queen Charlotte Sound, communicated to this survey by the Commander of H.M.S. *Egeria*. Constant progress is also being made in the reduction and analysis of tidal record from the principal stations, which improves the accuracy of the tide tables for all time to come.

The tide tables are prepared and issued in three sets as before; and a substantial improvement has been made in their form and arrangement for 1905, for greater convenience in reference, and to give place to further information. To meet the increasing demand, the total edition of the three sets is now increased to 3,000 copies, besides 1,600 copies of small pocket editions for the ports of St. John, N.B., and Quebec.

For the purpose of placing early information in the hands of mariners, special notices, prepared by Dr. Dawson, were issued; one in February, 1904, containing a preliminary summary of the results of his observations on the currents met on the steamship routes off the southern and eastern coasts of Newfoundland; one in April, giving

SESSIONAL PAPER No. 21

information respecting tides in the Gut of Canso, to correct the information contained in the *St. Lawrence Pilot*; and one in December, 1903, giving tidal differences for additional localities on the British Columbia coast.

Respectfully submitted,

December 1, 1904.

WM. P. ANDERSON,
Chief Engineer.

(INCLOSURE A.)

DETAILED REPORT OF THE CHIEF ENGINEER OF THE DEPARTMENT
OF MARINE AND FISHERIES ON CONSTRUCTION, ESTABLISH-
MENT AND IMPROVEMENT OF LIGHTHOUSES AND
OTHER AIDS TO NAVIGATION UP TO
NOVEMBER 30, 1904.

To the Deputy Minister,
Department of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit a detailed report on work done in the construction and establishment of aids to navigation for the year ending November 30, 1904.

In previous years this detailed report also referred to the maintenance of aids to navigation, but in consequence of the work of maintenance having been transferred to the Commissioner of Lights, it will be necessary for me to refer herein only to the construction and establishment of new aids, or to important repairs to existing aids done under the immediate supervision of this branch of the department.

NEW BRUNSWICK.

NEW AIDS TO NAVIGATION.

Tiner point.—A fog alarm was established at this place, on the north shore of the Bay of Fundy, on February 1, 1904.

Tiner point is the most prominent headland on the coast between Split rock and Negro head, and the fog alarm building, a rectangular wooden structure painted white, stands on the summit of the headland, with the horn projecting from its seaward face, elevated about 100 feet above the sea.

The fog alarm consists of a diaphone operated by air compressed by oil engines. It will give blasts of three seconds' duration every minute.

The building was erected under contract by Mr. John Flood, of St. John, N.B. His contract price was \$1,800. Subsequently he was employed to erect a dwelling house for the engineer, his contract price for this work being \$1,800. The total expenditure at this station on account of construction has been \$12,765.93.

Cedars.—A lighthouse has been established at The Cedars, on the east side of the River St. John, in Kings county, about $\frac{3}{4}$ mile up the river from Williams landing, to replace the temporary light at the latter place, which has been discontinued.

The tower, which stands on the edge of the river bank, is a square, wooden building, with sloping sides, painted white, surmounted by a square, wooden lantern, painted red. The height of the tower from its base to the ventilator on the lantern is 32 feet.

4-5 EDWARD VII., A. 1905

The light is a fixed white light, elevated 44 feet above high water mark, and should be visible 7 miles from all points of approach by water. The illuminating apparatus is dioptric of the seventh order.

The building was erected by days' labour under the direction of Mr. Kelly.

Miramichi North West bridge.—A light has been established on the bridge over the northwest branch of the Miramichi river, county of Northumberland, about $2\frac{1}{2}$ miles above Newcastle. The fixed red light is shown from a lens lantern hoisted on a mast, situated on the west side of the abutment at the south end of the draw span, and 122 feet from the north side of the channel and opening of draw.

AIDS TO NAVIGATION DISCONTINUED.

Williams landing.—In consequence of the establishment of a permanent lighthouse at The Cedars, the light temporarily maintained at Williams landing was considered unnecessary. It has therefore been discontinued and the mast removed.

Hatfield point.—The back range light at this point, on Belleisle bay, St. John river, has been discontinued; and the front light is now maintained as a single beacon light.

CHANGES IN EXISTING AIDS.

Cape Enrage.—The lighthouse tower at this Bay of Fundy station has been rebuilt. The new tower is a wooden building, square in plan, with sloping sides, painted white, surmounted by an octagonal iron lantern painted red. It is 29 feet high from its base to the top of the ventilator on the lantern.

The light is a fixed white light, elevated 125 feet above high water mark, and should be visible 15 miles from all points of approach by water. The illuminating apparatus is dioptric of the fourth order, and the illuminant petroleum vapour burned under an incandescent mantle.

The work was done by days' labour, under the supervision of Mr. John Kelly, Inspector of Lighthouses, and cost \$916.88.

Richibucto.—The channel through the bar across the entrance to the harbour having been shifted by the gales, or action of the ice, in the winter of 1903-4, the bar range lights were changed in the spring of 1904 under the supervision of the local inspector of lights, to suit the same.

The front mast now stands on the north side of the south beach, 113 feet back from the water's edge, 236 feet S. 39° E. from the middle of the old front range lighthouse tower, and 5,850 feet S. 37° E. from the outer end of the breakwater on the north beach. The light is a fixed white light, shown from a pressed glass lens lantern elevated 32 feet above high water mark and should be visible 10 miles.

The back light is shown from a pressed glass lens lantern hoisted on a mast 40 feet high, and is distant 236 feet S. 45° W. from the front light.

The light is a fixed white light, elevated 44 feet above high water mark, and should be visible 12 miles.

The light shown from the back range tower of the old bar range has been discontinued.

Oak point.—The range lights maintained at Oak point, on the Miramichi river, have been improved by substituting, for the lights shown from masts, stronger lights shown from inclosed lighthouse towers, erected on the sites formerly occupied by the masts and trestle work on which they stood. The new lights were put in operation on October 6, 1904.

The towers are wooden buildings, square in plan with sloping sides, surmounted by square wooden lanterns, and are painted white throughout.

The lights are fixed white, and should be visible 12 miles from all points of approach in the river and bay. The illuminating apparatus is dioptric of the seventh order.

SESSIONAL PAPER No. 21

The front tower stands on the north bank of the river, on the extremity of a point $\frac{1}{4}$ mile below Oak point.

It is 33 feet high from its base to the top of the ventilator on the lantern, and the light is elevated 45 feet above high water mark.

The back tower stands on the bank of the river, 1,800 feet N. 55° E. from the front one. It is 53 feet high from its base to the top of the ventilator on the lantern. The light is elevated 60 feet above high water mark.

The new buildings were erected under contract by Mr. R. A. Russell, of Loggieville, N.B. His contract price was \$1,480.

BUOYAGE AND BEACONS.

Gray Mare ledge.—The black iron spindle on this danger in the entrance to L'Etang harbour was carried away in the winter of 1903-4.

Quaco.—The bell buoys marking the ledge and reef, and the conical buoy marking the shoal were all carried away by ice early in 1904, but were replaced in position on April 22.

Shediac north channel.—In September, 1902, the channel from the open strait to the mouth of Shediac river, north of Shediac island, was marked by 26 balises or bushes and 2 cask buoys, which will hereafter be maintained as aids to navigation.

The channel is a very shallow one, which can only be utilized by fishermen having local knowledge. It meanders through flats covered with eel grass.

There are 13 spruce bushes on the port side and 13 birch bushes on the starboard side. The point where the channel crosses the bar is marked by two cask buoys, a red buoy on the starboard side, off the northeast corner of Seal bank, in 6 feet water, and a black buoy on the island side, in 5 feet water.

Vin bay.—A black spar buoy was established off the western end of Vin island in May, 1904.

It is moored in 12 feet water 5 cables N. 62° W. from the front range light on Vin island.

Shippigan.—An iron can buoy, painted in red and black horizontal bands, has been established on the middle of Ship flat, a rocky shoal about $1\frac{1}{4}$ mile north of Shippigan island.

This flat, which has several large rocks on it, is described as being about $\frac{1}{2}$ mile long E. and W. and about 400 yards wide N. and S. The depth of water on the shoal varies from 5 to 7 feet.

NOVA SCOTIA.

NEW AIDS TO NAVIGATION

Spencer island.—A lighthouse established at Spencer island settlement, on the shore of the mainland about one mile northerly from Spencer island, Bay of Fundy, was put in operation on July 15, 1904.

The lighthouse tower stands on the beach, 63 feet back from the water's edge, to the eastward of the inner end of the Government pier. It is a wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. It is 33 feet high from its base to the ventilator on the lantern.

The light is a fixed red light, elevated 34 feet above high water mark, and should be visible 7 miles from all points of approach by water. The illuminating apparatus is dioptric of the seventh order.

The building was erected by days' labour, under the supervision of the officers of the agency, and cost \$645.87.

4-5 EDWARD VII., A. 1905

Cape Sharp.—A fog alarm, established at Cape Sharp light station, on the north side of the entrance to the Basin of Mines, in the County of Cumberland, was put in operation on March 1, 1904.

The fog alarm building is a rectangular, wooden structure, painted white, with a red roof. It stands 225 feet N.N.W. from the lighthouse, with the horn projecting from its seaward face, at an elevation of 45 feet above high water mark.

The fog alarm consists of a diaphone, operated by air compressed by oil engines. It will give blasts of $3\frac{1}{2}$ seconds' duration every minute.

The building was put up under contract, by Mr. A. H. Dyer, of Parrsborough. His contract price was \$1,307. The machinery was supplied by the Canadian Fog Signal Company of Toronto, and cost \$2,400.

Canning river.—Two lighthouse towers have been erected at Canning river, western side of the Basin of Mines, and the lights were put in operation on the opening of navigation in 1904.

Both towers are inclosed wooden buildings, square in plan, with sloping sides, surmounted by square wooden lanterns, the whole painted white. Each tower is 27 feet high from its base to the top of the ventilator on the lantern. They are supported on piles extending four feet above the surface of the ground.

Porter point lighthouse.—The outer lighthouse stands on the south side of the entrance to Canning river (Canard creek), on the north extremity of Porter point.

The light is a fixed red light, elevated 29 feet above high water mark, and should be visible 5 miles from all points of approach by water. The illuminating apparatus is a pressed glass lens.

Borden wharf lighthouse.—The inner lighthouse stands on the site of the old Borden wharf, on the south side of the river, distant 5,245 feet N. $65^{\circ} 35'$ W. from Porter point lighthouse, at a point where the channel turns abruptly from south to east.

The light is a fixed red light, elevated 26 feet above high water mark, and should be visible in the straight reaches of the channel to the northward and eastward. The illuminating apparatus is a pressed glass lens.

The buildings were erected under contract by Mr. Wm. Rand of Canning. His contract price was \$1,190.

Granville Centre.—A light has been established on the outer end of the Government wharf at Granville Centre, north side of Annapolis river.

The light is shown from a lantern hoisted on a mast with a white shed at its base. The mast is 23 feet high.

The light is a fixed red light, elevated 29 feet above high water mark, and should be visible 2 miles from all points of approach by water. The illuminating apparatus is dioptric of the seventh order.

The mast and shed used on Digby pier, and removed when a permanent lighthouse was built there, were utilized for this new station.

Gilbert point.—A lighthouse has been erected on the east extremity of Gilbert point, east side of St. Mary bay, from which a light was first shown on the 18th August, 1904.

The building consists of a square wooden dwelling painted white, with a square wooden lantern painted white rising from the middle of the cottage roof. The roofs of both the dwelling and lantern are painted red. The building is 36 feet high from its base to the top of the ventilator on the lantern. It stands 30 feet back from the water's edge, on ground 10 feet above high water mark.

The light will be a fixed red light, elevated 40 feet above high water mark, and should be visible seven miles from all points of approach by water. The illuminating apparatus is dioptric of the seventh order.

The building was put up under contract by Mr. John Roney, of Granville Ferry, N.S. His contract price was \$1,193.

Grand Passage.—A fog bell has been established at Grand Passage lighthouse, on the north point of Brier island, Bay of Fundy.

SESSIONAL PAPER No. 21

The bell is supported on framework immediately outside that side of the tower which faces the northern entrance to Grand passage. It is operated by machinery, and during thick or foggy weather, will give single strokes at intervals of 5 seconds.

Lurcher shoal.—A lightship was established in February, 1904, off Lurcher shoal, outside of Yarmouth, in the Bay of Fundy, in about 36 fathoms, 2 miles west of the $1\frac{1}{2}$ fathom spot marked by the whistling buoy.

She is a steel steamer, with two masts and no bowsprit. The hull is painted red, with the word 'Lurcher' in white letters on each side, and the number of the vessel, 'No 14' on each bow. The circular gallery under the lanterns at each mast head, the smoke stack, and the fog signal between the masts, are all painted red.

Three seventh-order lens lanterns encircle each mast head, at an elevation of 60 feet above the water. From them occulting electric lights, showing bright for 8 seconds and eclipsed for 4 seconds, alternately, are exhibited. These should be visible 13 miles from all points of approach. If from any cause the electric light apparatus should become inoperative, fixed white oil lights, of less intensity, will be shown.

A diaphone, operated by compressed air, is used as a fog alarm. This is similar in sound to a siren, but gives a note of great intensity and uniform pitch. It will give blasts of 4 seconds' duration, with intervals of 56 seconds between the blasts. Should it become disabled, blasts of similar duration and frequency will be sounded through a whistle. Should both from any cause become inoperative a bell will be rung by hand.

The vessel was built under contract by the Polson Iron works of Toronto, their original contract price being \$89,975.

She was not ready for delivery at the close of navigation in 1903, but in consequence of the importance of having her on the station for the winter trade to St. John, she was taken in an unfinished state from Toronto to Quebec, and forwarded to Halifax under her own steam in December, in charge of Capt. Koenig. She encountered heavy gales and much ice in the gulf, proving herself a good sea boat, but getting her bows so badly stove that she had to undergo extensive repairs in Halifax. Here she was completed and forwarded to her station in February. A few days later she broke from her moorings and put into Yarmouth.

In September, 1904, she was fitted with a submarine bell, which, during thick weather, will strike the ship's number, 14, every twenty-three seconds, as follows: One stroke; five seconds' interval; four strokes at intervals of two seconds; then an interval of ten seconds. There may be slight variations in these intervals, owing to varying pressure of air or steam used to operate the signal.

Vessels equipped with receiving apparatus are expected to be able to hear the bell at five miles, and determine its bearing within a quarter point. Vessels not so equipped should receive a warning signal at from one to two miles, depending on the construction of the ship. This should be audible to an observer below the water line and close to the hull of the vessel.

Instructions were given to have the bell rung on the approach of any vessel within five miles, and masters of vessels were requested to report as to the distance the bell was heard, with any other particulars noted respecting this new aid to navigation.

On the 1st October, 1904, the lightship again broke from her moorings, and she was consequently sent to drydock for overhaul before resuming her station for the winter. Up to the date of writing this report she has not been replaced on her station.

Musquodoboit.—Range light towers have been erected at the entrance of Musquodoboit inlet, from which lights were shown on the 1st April, 1904.

Both towers are white, wooden inclosed structures, square in plan, with sloping sides, surmounted by white, square wooden lanterns with red roofs. The lights are fixed red lights, and the illuminating apparatus pressed glass lenses.

The front tower stands on a concrete pier on Shag ledge.

The pier is 16 feet square, and its top is 5 feet above high water mark. The tower is 20 feet high from the top of the pier to the ventilator on the lantern. The light is elevated 19 feet above high water mark, and should be visible 4 miles from all points of approach by water.

4-5 EDWARD VII., A. 1905

The back tower stands on French point, Kent island, about $\frac{5}{8}$ mile N. 31° E. from the front tower. It is 54 feet high from its base to the top of the ventilator on the lantern. The light is elevated 59 feet above high water mark, and should be visible 4 miles from all points of approach by water.

The lights are intended to guide vessels in from sea to a safe anchorage inside of Steering beach.

The buildings were put up by days' labour under the supervision of our Halifax officers, and under the foremanship of Mr. McLellan. They cost \$2,512.

West Arichat.—Inclosed range light towers were erected at West Arichat, and the lights put in operation on the 1st September, 1904.

Both towers are wooden buildings, square in plan, with sloping sides, surmounted by square, wooden lanterns, the whole painted white.

The lights shown are fixed red lights, which should be visible 7 miles in the line of range. The illuminating apparatus is catoptric.

The front tower stands on land 3 feet above high water mark, on the inner end of the beach on the northern side of the harbour. The tower is 27 feet high from its base to the ventilator on the lantern. The light is elevated 29 feet above high water mark.

The back tower stands on the mainland, on ground 10 feet above high water mark, and 40 feet back from the water's edge, 1,800 feet N. 86° E. from the front tower. It is 33 feet high from its base to the ventilator on the lantern. The light is elevated 37 feet above high water mark.

The buildings were erected under contract by Mr. Edward Doyle, of Poulamon, N.S. His contract price was \$825.

Marble mountain.—Inclosed range light towers, from which fixed red catoptric lights are shown, have been erected at Marble mountain, Clarke cove, on the north side of West Bay, Bras d'Or lake, Cape Breton; and the pole light previously maintained in the same locality has been discontinued.

Both towers are wooden structures, square in plan, with sloping sides, surmounted by square wooden lanterns, the whole painted white.

The front tower stands on land 20 feet above high water mark, 40 feet back from the water's edge, and about 100 yards easterly of the site of the discontinued pole light. It is 32 feet high from its base to the top of the ventilator on the lantern.

The light is elevated 46 feet above high water mark, and should be visible 8 miles in the line of range.

The back tower stands on the side of the mountain, 800 feet N. 42° W. from the front tower. It is 20 feet high from its base to the top of the ventilator on the lantern. The light is elevated 244 feet above high water mark, and should be visible 11 miles in the line of range.

The two lights in one, bearing N. 42° W., lead in between Paddle and Nameless shoals, and between the shoals off George and Cameron islands.

The work was done by days' labour, under the supervision of the officers of our Halifax agency, and under the foremanship of Mr. Whebby. The cost of construction was \$1,950.43.

Iona.—In December, 1901, the lighthouse maintained from 1874 to 1894 at Iona, was again put in operation, and is now maintained to mark Grand Narrows in addition to the lights on the Intercolonial railway bridge. The lighthouse stands near the extremity of Uniacke point, on the north side of Grand Narrows, between Iona railway station and the north end of the railway bridge, and close to the east side of the railway track.

The lighthouse is a wooden building, square in plan, with sloping sides, painted white, surmounted by an octagonal lantern painted red. It is 20 feet high from its base to the vane on the lantern.

The fixed white catoptric light is elevated 29 feet above high water mark, and should be visible 10 miles from all points of approach by water.

SESSIONAL PAPER No. 21

Macfarlane point.—Two range lights established on Macfarlane point, in Wallace harbour, on the south side of the Strait of Northumberland, were put in operation on the 20th October, 1904.

They are shown from wooden towers, square in plan, with sloping sides, surmounted by square wooden lanterns, the whole painted white. The fixed red catoptric lights should be visible four miles in, and over a small arc on each side of, the line of range.

The front tower stands upon the northeastern extremity of Macfarlane point, on the south side of the harbour, about 20 feet back from the edge of the bank, on land 16 feet above high water level, and 400 feet south of the site of the old ballast jetty.

The tower is 30 feet high from its base to the ventilator on the lantern. The light is elevated 41 feet above high water mark.

The back tower stands 1,860 feet N. 80° W. from the front one, on land 60 feet above high water mark. The tower is 40 feet high, from its base to the ventilator on the lantern, and the light is elevated 100 feet above high water mark.

The buildings were erected under contract by Mr. John D. Reid, of Head Wallace Bay, N.S. His contract price was \$2,400.

Pictou island, west end.—A lighthouse, established on the west end of Pictou island, will be put in operation on the opening of navigation in 1905.

The lighthouse, which stands on the west point of the island, about 100 feet from its extremity, is an octagonal wooden building, with sloping sides, painted white, surmounted by a polygonal iron lantern, painted red. The height from its base to the ventilator on the lantern is 49 feet.

The light will be a group-revolving white light, showing 3 flashes with intervals of 15 seconds between their points of greatest brilliancy, followed by an interval of 30 seconds, the system completing a revolution in one minute. The light is elevated 61 feet above high water mark, and should be visible 13 miles from all points of approach by water, except where hidden by trees and high land on the island to the eastward. The illuminating apparatus is catoptric.

This building was erected under contract, by Benj. D. Huntley, of Vernon River, P.E.I. His contract price was \$1,470.

IMPROVEMENTS IN EXISTING AIDS.

Wolfville.—The outer end of the government wharf at this Bay of Fundy port was carried away by storm on 5th March, 1904. Prior to its destruction the lighthouse which stood on it, was removed to shore, and has since been established upon a foundation of piles driven in the marsh near the inner end of the wharf, and 100 feet S. 5° W., from its former position; and the light will be permanently operated from this new site. There is no change in the level or characteristic of the light.

Digby pier.—An inclosed lighthouse tower has been erected on the outer end of the government pier at Digby, west side of Annapolis basin, to replace the mast from which the light was formerly exhibited. The new light was put in operation on the 6th June, 1903, and the mast and shed removed, and later utilized for a light at Granville ferry.

The tower is a wooden building, square in plan, with sloping sides, surmounted by a square, wooden lantern, the whole painted white. The tower is 27 feet high from its base to the top of the ventilator on the lantern.

The light is a fixed red light, elevated 30 feet above high water mark, and should be visible 7 miles from all points of approach by water. The illuminating apparatus is dioptric of the seventh order.

The new building was erected by J. Roney, of Granville Ferry, N.S., at a cost of \$494.

Sand spit.—The lighthouse on Sand spit, on the east side of the entrance to Shelburne harbour, has been moved on to a new foundation immediately to the eastward or on the landward side of the old wooden crib on which it formerly stood. The new foundation is of concrete, square in plan, 17 feet high, and is whitewashed.

4-5 EDWARD VII., A. 1905

The work was done by days' labour, under the supervision of the officers of our Halifax agency, and the foremanship of Mr. McLellan, and cost \$1,562.60.

Inner Sambro island.—The fishing light maintained on the western extremity of Inner Sambro island, west of the entrance to Halifax harbour, which was originally exhibited during the winter months only, proved so useful that in April last arrangements were made to maintain it throughout the year in future.

Guysborough.—The lighthouse near Peart point, on the west side of the entrance to Guysborough harbour, was burnt down on the 12th September, 1904.

A temporary fixed white light, elevated 30 feet above high water mark, is shown from an anchor lens lantern hoisted on a mast erected on the site of the old lighthouse.

Mabou.—The mast with shed at its base from which a fixed white lantern light was shown, on the outer end of the breakwater on the south-west side of the dredged channel at the entrance to Mabou harbour, was carried away by a gale on the night of the 14th November, 1904. A temporary pole light is being maintained until a more permanent arrangement can be made.

Pictou bar.—A lighthouse has been erected on the outer end of Pictou bar, on the south side of the entrance to Pictou harbour, to replace the lighthouse destroyed by fire on the 26th May, 1903. The lights have been put in operation, and the mast from which temporary lights were exhibited, has been removed.

The lighthouse, which stands on the site of the old tower, is an octagonal wooden tower, surmounted by an octagonal iron lantern. The lighthouse is 48 feet high from its base to the ventilator on the lantern. It is painted in alternate red and white vertical stripes, and the lantern is painted red.

The light shown from the iron lantern is a fixed white light, elevated 50 feet above high water mark, and should be visible 12 miles from all points of approach by water. The illuminating apparatus consists temporarily of two seventh-order anchor lens lanterns.

A fixed red catoptric light is also shown from a lamp in the window below the iron lantern and in the seaward face of the tower. It is elevated 23 feet above high water mark, and should be visible 6 miles in the direction of the shoals off the east end of Pictou island.

The building was erected by days' labour, under the foremanship of Mr. E. F. Munro, at a cost of \$3,471.99.

Pictou.—In November, 1904, the light shown from the east side of the tower of the Customs House in the town of Pictou, was changed in colour from white to red, the light shown from the south face of the tower remaining fixed white. Both lights were strengthened by substituting electric incandescent lamps in the foci of reflectors for the gas lights previously used.

BUOYAGE AND BEACONS.

Peters island reef.—The black iron spindle, marking the end of the reef extending northeastward from Peters island, Grand passage, has been bent down by floating ice, so that it is not visible after the tide has made for an hour. This spindle will be repaired as soon as ice has ceased to run.

Bull rock.—In January, 1904, a bell buoy was established, moored in 15 fathoms water, $\frac{1}{4}$ mile southwardly from Bull rock, at the entrance to Lockeport, south coast of Nova Scotia, replacing the iron can buoy surmounted by a wooden cage, heretofore maintained in the same locality.

The buoy is of steel, painted black, with 'Bull rock' in white letters on the top, and is surmounted by a bell rung by the motion of the buoy on the waves.

Crawford ledge.—In October, 1904, a bell buoy was established in 12 fathoms water, $\frac{1}{2}$ mile off Crawford ledge, eastern side of entrance to St. Margaret bay, south coast of Nova Scotia. The buoy is painted red, with 'Crawford ledge' in white letters on the deck, and is surmounted by a bell rung by the motion of the buoy on the waves.

SESSIONAL PAPER No. 21

Indian harbour.—Four wooden spar buoys were, in April, 1904, established in Indian harbour, east side of St. Margaret bay, to mark shoals in the channel leading from Wreck island to the coves in the harbour. Three of these buoys are painted red and are surmounted by conical topmarks; the fourth buoy is black.

Halifax.—A bell buoy was, in December, 1903, established off Pleasant shoal, Halifax harbour, replacing the black iron can buoy heretofore maintained in the same position.

The buoy is of steel, painted black, with 'Pt. Pleasant' in white letters, and is surmounted by a bell rung by the motion of the buoy on the waves.

It is moored in 10 fathoms off the eastern extremity of Pleasant shoal, with Pleasant point bearing N. 67° W., distant $6\frac{2}{5}$ cables.

Shag bay breaker.—In October, 1904, a bell buoy was established in 22 fathoms water $\frac{1}{4}$ mile off the southwest end of Shag bay breakers, south coast of Nova Scotia, replacing the red conical buoy heretofore maintained in the locality.

The buoy is painted red, with 'Shag bay breaker' in white letters on the deck, and is surmounted by a bell rung by the motion of the buoy on the waves.

Blind and Shag bays.—In October, 1904, the following buoys were established at the entrances to Blind bay and Shag bay, south coast of Nova Scotia:—

1. A black spar buoy on the eastern side of the shoal south of Learys point.
2. A black spar buoy on the eastern side of Round rock.
3. A black spar buoy on the eastern side of the middle ground, Blind bay.
4. A black spar buoy on the eastern side of Frying Pan rock.
5. A black spar buoy at Gull shoal, (locally known as Pollock shoal), between Outer and Inner Gull.

Winter buoy service.—On the close of navigation last year, it was decided that all the bell buoys and whistling buoys on the south and east coasts of Nova Scotia from Pennant point, westward of Halifax, to Cape North, Cape Breton, should be maintained all the year round, with the exception of the following buoys:—

Cape Breaker bell buoy, Grime shoal whistling buoy, Louisburg whistling buoy and Louisburg bell buoy, will be replaced for the winter each year by wooden spar buoys coloured similarly to the signal buoys.

Canso harbour bell buoy, Fourché bell buoy and Point Aconi whistling buoy will be taken up for the winter each year.

Mariners were notified that, should heavy gulf ice appear on the coast, it might become necessary temporarily to lift the remaining signal buoys to prevent their loss.

Guion island.—A whistling buoy on the Courtenay principle was in May, 1904, established off Guion island, south coast of Cape Breton, moored in about 25 fathoms water, $1\frac{1}{2}$ miles S.E. from Bull rock.

The buoy is a conical buoy, painted black, with 'Guion Id.' in white letters on the side, and is surmounted by a 10-inch whistle, sounded by the action of the waves.

PRINCE EDWARD ISLAND.

IMPROVEMENTS IN EXISTING AIDS.

Annandale.—The tower from which the back range light is shown has been inclosed and painted white. The work was done under the supervision of Mr. M. Walsh.

Summerside.—The back range light tower has been inclosed and painted white, under the supervision of Mr. M. Walsh.

New London.—The channel over the bar at the entrance to New London harbour, which has proved a very unstable one, has again shifted so that the best water is now in the alignment of the old range lights.

4-5 EDWARD VII., A. 1905

A temporary back range light, established in 1903, shown from a lantern hoisted on a pole situated 1,019 feet S. 48° W. from the front light, has therefore been discontinued and the channel over the bar is now marked by the front white light in one with the main red light, which is situated 1,500 feet S.W. from it.

BUOYAGE.

Georgetown.—The wooden can buoy maintained off the southeast extremity of Cardigan shoal, at the entrance to Georgetown harbour, was, on May 17, 1904, replaced by a steel conical buoy, painted red, moored in 6 fathoms water.

In connection with this change, an inspection of the position of all buoys in the harbour was made by Capt. D. McKinnon, D.G.S. *Brant*, and a notice published describing their correct locations.

New London.—The wooden can buoy maintained on the outside of the bar at the entrance to New London harbour, was, on May 20, 1904, replaced by a steel conical buoy, painted red, moored in $3\frac{1}{2}$ fathoms water, to mark the starboard side of the best water on the bar. This buoy is a little to the westward of the alignment of the New London range lights. From the buoy Cape Tryon bears N. 42° W.

The wooden spar buoy marking the eastern end of Simms point reef was replaced by a steel conical buoy, moored in 9 feet water.

QUEBEC.

NEW AIDS TO NAVIGATION.

Garde point.—Some years ago a small light vessel was maintained off Pointe la Garde, in the Restigouche river, to indicate the entrance to an intricate channel. In consequence of the temporary cessation of night traffic up to Campbellton the vessel was afterwards withdrawn. As however a large steamboat and timber shipping trade has again sprung up, a small light vessel was in August, 1904, again placed in the position indicated.

The light is fixed white, shown from a pressed lens lantern hoisted on a mast. It is elevated 18 feet above water, and should be visible 8 miles up and down stream.

The vessel is a yacht 23 feet long, and is anchored on the north side of the main channel.

The light is maintained by contract, the price being \$400 per annum, which includes providing the boat.

Duthie point —A lighthouse was put in operation on the opening of navigation in 1904 on Duthie point, New Richmond, in the county of Bonaventure.

The lighthouse stands on the southwest extreme of this point, on the east side of the mouth of Grand Cascapedia river, 50 feet back from the top of the bank. The structure is an inclosed wooden tower, square in plan, with sloping sides, surmounted by a square, wooden lantern, the whole painted white. It is 33 feet high from its base to the top of the ventilator on the lantern.

The light is a fixed white light, elevated 50 feet above high water mark, and should be visible 12 miles from all points of approach by water. The illuminating apparatus is dioptric of the seventh order.

The light building was erected by days' labour under the superintendence of Mr. P. A. Perron, Engineer for the Department of Public Works, and cost \$1,798.65.

Bryon island.—A lighthouse established on the west end of Bryon island in the Magdalen islands group, will be put in operation on the opening of navigation in 1905.

The lighthouse stands 755 feet from the extreme west point of the island, and is an octagonal, wooden building, with sloping sides, painted white, surmounted by a polygonal iron lantern, painted red. The height from its base to the ventilator on the lantern is 49 feet.

SESSIONAL PAPER No. 21

The light will be a group-revolving white light, showing 3 flashes with intervals of 15 seconds between their points of greatest brilliancy, followed by an interval of 30 seconds, the system completing a revolution in one minute. The light is elevated 126 feet above high water mark, and should be visible 19 miles from all points of approach, except where hidden by trees and high land on the island to the eastward. The illuminating apparatus is catoptric.

This lighthouse was erected under contract by Mr. E. F. Munro of Westville, N.S. His contract price was \$5,497.

Sandy beach point.—A lighthouse established on the north extremity of Sandy beach point, at the entrance to Gaspé basin, was put in operation on November 25, 1904.

The lighthouse stands upon a cribwork pier sunk in 6 feet water carried 4 feet above high water level, and built with a cutwater on its up stream end. The lighthouse is a square wooden building with vertical walls, with a square wooden lantern standing on the apex of its cottage roof. It is painted white with red roof, and is 34 feet high from the pier to the ventilator on the lantern. An elevation of this building is herein shown.

The light is a fixed white light, elevated 32 feet above high water mark, and should be visible 10 miles from all points of approach. The illuminating apparatus is dioptric of the seventh order.

The lightship heretofore marking the extremity of the spit at this point has been withdrawn and her maintenance permanently discontinued.

This building was erected under contract by Mr. Sam. Veit, of Gaspé. His contract price was \$8,450.

Anticosti lightship.—A lightship was established in July, 1904, in 22 fathoms water, 8 miles southeast from Heath point lighthouse, Anticosti.

The lightship is a steel steamer with two masts and no bowsprit. The hull is painted red, with the word 'Anticosti' in white letters on each side, and the number of the vessel, 'No. 15' on each bow. The circular gallery under the lanterns at each mast head, the smokestack, and the fog signal between the masts, are painted red.

Three seventh-order lens lanterns encircle each mast head, at an elevation of 60 feet above the water. From them occulting electric lights, showing bright for 10 seconds and eclipsed for 5 seconds alternately are exhibited. These should be visible 13 miles from all points of approach. If from any cause the electric light apparatus should become inoperative fixed white oil lights, of less intensity, will be shown.

A diaphone, operated by compressed air, is used as a fog alarm. It gives blasts of $4\frac{1}{2}$ seconds' duration, separated by silent intervals of $55\frac{1}{2}$ seconds. Should it become disabled, blasts of similar duration and frequency will be sounded through a whistle. Should both from any cause become inoperative a bell will be rung by hand.

This vessel was built at the Polson Iron Works, Toronto, the contract price being \$89,975.

In September the engineer reported that he was unable to make the occulting apparatus work, and notice was given that for the remainder of the season fixed electric lights only would be shown.

In August this lightship was fitted with a submarine bell, which, during thick or foggy weather, will give strokes indicating the lightship's number '15,' as follows:—One stroke, followed by an interval of four seconds, and then five strokes at intervals of one second, followed by an interval of ten seconds.

Vessels equipped with the receiving apparatus should be able to hear the bell at a distant of five miles and determine its bearing within one quarter of a point. Vessels not so equipped should receive a warning signal when from one to two miles distant depending on the construction of the ship. This should be audible to an observer below the water line and close to the hull of the vessel.

Instructions were given to ring the bell on the approach of any vessel within five miles of the lightship, and Masters of vessels were requested to report as to the distance the bell was heard, and any other information available respecting this new aid to navigation.

4-5 EDWARD VII., A. 1905

On the 7th November this vessel left her station under her own steam, for Quebec, without orders, the captain claiming that on account of shortness of chain and defective shackle, it was impossible to remain at the station during heavy weather. As it was so near the close of navigation it was decided not to send her back to her station.

Ste. Félicité.—A fog alarm, established at Ste. Félicité, on the south shore of the River St. Lawrence below Quebec, was put in operation on October 25, 1904.

The building stands immediately inside of high water mark on the extremity of the low point which projects farthest out from the general trend of the coast, seven miles below Matane lighthouse and two miles above Ste. Félicité church. It is a rectangular wooden structure painted white, with the trumpet projecting from its seaward face at an elevation of 15 feet above high water mark.

The fog alarm consists of a diaphone operated by air compressed by oil engines. It will give one blast of $3\frac{1}{2}$ seconds' duration every minute.

The building was erected by days' labour by men sent from the agency workshops at Quebec, under the foremanship of Mr. A. Martel, and cost \$6,095.95.

Lower Traverse.—The lighthouse referred to in previous reports as in course of construction on a pier in the lower part of the Traverse of St. Roch, near the northern end of the shoals of St. Roch, River St. Lawrence below Quebec, was completed, and the permanent light shown from it, on August 10, 1904.

The lighthouse is a rectangular building with concrete walls and mansard roof; the tower portion at the northeast end of the structure forming a wing to the main building, and being surmounted by a cylindrical iron tower painted brown, capped by a polygonal iron lantern painted red. The height of the building from its base to the vane on the lantern is 50 feet.

The steel-sheathed concrete pier on which the lighthouse stands is rectangular with two pointed sloping ends, and is painted brown.

The light is a white light, giving one bright flash of one second duration every five seconds. It is elevated 55 feet above high water mark, and should be visible 13 miles from all points of approach by water. The illuminating apparatus is dioptric of the third order, and the illuminant is petroleum vapour burned under an incandescent mantle.

On the same date a fog alarm was established at the lighthouse. It consists of a diaphone, operated by compressed air, which will, during thick or foggy weather, give blasts of $3\frac{1}{2}$ seconds' duration, separated by silent intervals of $56\frac{1}{2}$ seconds.

The horn projects from the north or seaward face of the lighthouse, and is elevated 20 feet above high water mark.

The pier and lighthouse were erected under contract by Messrs. Dussault & Lemieux, Lévis. The illuminating apparatus was supplied by Messrs. Chance, Bros. & Co., Birmingham, and the fog alarm machinery by the Canadian Fog Signal Co., Toronto.

Pointe à Basile.—The back light of the Pointe à Basile range, which indicates the axis of the ship channel from the neighbourhood of Cap Rouge to its intersection with the alignment of St. Antoine lower range, was on the opening of navigation in 1904 exhibited from an inclosed tower erected in the position formerly occupied by the temporary shed from which the light was previously shown and the shed and day beacon, were removed.

This building was erected by workmen sent from the agency workshops in Quebec, under the foremanship of Mr. E. Roy, and cost \$562.22.

On November 1, 1904, it was destroyed by a fire, known to have been of incendiary origin. A new steel tower is being erected. Pending its completion a temporary pole light is being shown.

Grondines point range lights.—The axis of the cut dredged through Batture Cap à la Roche, immediately above Cap à la Roche, was on the opening of navigation in 1904 marked by a range of lights to be known as Grondines point range lights.

The front light is shown from a tower standing on a concrete pier, built within 40 feet of the place where the low beacon of Grondines point day beacons formerly stood.

SESSIONAL PAPER No. 21

The tower is an open steel skeleton frame, square in plan, with sloping sides, surmounted by a square, galvanized iron lantern, the whole painted red. The pier is whitewashed. The tower is 29 feet high from the pier to the ventilator on the lantern.

The light is a fixed white light, elevated 33 feet above the level of the river, and should be visible 7 miles in the line of range. The illuminating apparatus is catoptric.

The back light is shown from the tower heretofore used as a day beacon on the extremity of Grondines point, east of Grondines village church and close to an old stone windmill; it is also 8,260 feet N. 84° E from the front tower.

It is an inclosed wooden structure, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. It is 61 feet high from its base to the ventilator on the lantern.

The light is a fixed white light, elevated 66 feet above the level of the river, and should be visible 8 miles in the line of range. The illuminating apparatus is catoptric.

Grondines upper range.—The axis of the cut dredged through Batture des Belles Filles, opposite Cap Levraut, will be marked by range lights shown from towers replacing the day beacons formerly marking the same alignment. These lighthouses will be known as Grondines upper range.

The front tower stands on the site of the low beacon, about $2\frac{1}{2}$ miles above the Grondines point back light. It is an inclosed wooden structure, square in plan, with sloping sides, surmounted by a square, wooden lantern, the whole painted white. It is 18 feet high from its base to the ventilator on the lantern.

The light is a fixed white light, elevated 28 feet above the level of the river, and should be visible 8 miles in the line of range. The illuminating apparatus is catoptric.

The back tower stands on the site of the high beacon, 6,800 feet N. 62° E. from the front light. It is an inclosed wooden structure, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. It is 40 feet high from its base to the ventilator on the lantern.

The light is a fixed white light, elevated 68 feet above the level of the river, and should be visible 9 miles in the line of range. The illuminating apparatus is catoptric.

The work done in connection with the removal of the old light buildings, and the erection of the above described pier and towers was performed by days' labour, under the supervision of Mr. E. Roy, of the Quebec Agency, and cost \$2,990

Champlain upper range.—The axis of the ship channel from Citrouille point to the village of Champlain was for many years marked by a pair of day beacons standing on the north shore of the river above the village of Champlain.

These two beacons have now been adapted for night navigation by hoisting on each of them a lantern showing a fixed white light, which should be visible 5 miles in the line of range.

The front beacon stands on the bank of the river, about $\frac{3}{5}$ mile above the village church.

Becancour range.—Range lights were, in October, 1904, established to mark the axis of the ship channel from Batture à Bigot through Becancour course to Becancour bend. The lights shown are fixed white lights, which should be visible 6 miles in the line of range.

The front light is shown from a lantern attached to Becancour day beacon, on the south shore of the river St. Lawrence, about $\frac{4}{5}$ mile above the mouth of Becancour river.

The back light is 1,920 feet S. 64° 20' W. from the front light. It is shown from a lantern hoisted on a pole 65 feet high.

Cap Madeleine village range.—The axis of the ship channel through Becancour traverse has heretofore been marked by a pair of day beacons standing on the north shore of the river in the village of Cap Madeleine.

The two beacons were, in October, 1904, adapted for night navigation by hoisting on each of them a lantern showing a fixed white light, which should be visible 4 miles in the line of range.

4-5 EDWARD VII., A. 1905

The front beacon stands on the bank of the river, about $\frac{1}{3}$ mile below the village church, the back beacon 2,250 feet N. 87° W. from the front one.

The two improvements last described were made under the supervision of Mr. U. P. Boucher, agent of this department at Montreal.

Contrecoeur Traverse range.—New range light buildings have been erected on the south side of the River St. Lawrence, about 2 miles above Contrecoeur, to mark the axis of the improved ship channel at Contrecoeur traverse. The axis of the new range is paralled to and 75 feet eastward of the old range. The new range lights were put in operation on July 15, 1904, and the range lights heretofore maintained in this locality discontinued and the buildings removed.

The front tower stands on ground about 450 feet back from the water's edge. It is distant about $2\frac{1}{8}$ miles above Contrecoeur church, and is opposite the lower end of Ile Bouchard.

The tower is a square, wooden building, with sloping sides, painted white. It stands on a whitewashed concrete pier. The tower is 12 feet high and the pier 15 feet high.

The light is a fixed white light, elevated 35 feet above the summer level of the river, and should be visible 6 miles in the line of range. The illuminating apparatus is catoptric.

The back tower is situated 2,110 feet S. $28^{\circ} 51'$ W. from the front tower, and 175 feet N. $54^{\circ} 9'$ E. from the site of the old front range light.

The tower consists of an open steel framework, square in plan, with sloping sides, painted brown, surmounted by an inclosed wooden watchroom and a square wooden lantern. The side of the framework facing the channel is rendered more conspicuous as a day beacon by being covered half way down with wooden slatwork. The lantern roof is painted red, the remainder of the lantern, the watchroom, and the slats, are white. The height of the tower from its base to the ventilator on the lantern is 64 feet.

The light is a fixed white light, elevated 95 feet above the summer level of the river, and should be visible 6 miles in the line of range. The illuminating apparatus is catoptric.

This work was done by days' labour, under the superintendence of Mr. E. Roy, of the Quebec Agency.

AIDS TO NAVIGATION DISCONTINUED.

Lower Traverse lightship.—When the permanent light and fog alarm on the new pier at the Lower Traverse were put in operation, the lightship previously maintained in that locality became superfluous. She was consequently withdrawn from service.

Bay St. Paul.—The fog bell at Bay St. Paul lightstation, River St. Lawrence, below Quebec, which was rung by hand in answer to the signals of vessels, has been discontinued.

Grondines.—When the two new pairs of range lights marking the ship channel above Grondines, were put in operation on the opening of navigation in 1904, the old range lights, which marked the old shallow channel were discontinued, and the towers removed.

BUOYAGE.

Outarde bay and river, and Bersimis.—Buoys used to be maintained in Outarde bay, to indicate the mooring ground for vessels loading lumber, and in the entrances to Outarde river and Bersimis river to facilitate the passage of lighters used in loading such vessels.

The saw mills in that vicinity are not now in operation, and consequently the buoys in the above mentioned localities, formerly maintained by the saw mill owners under agreement with this department, have been abandoned.

SESSIONAL PAPER No. 21

Traverse of St. Roch.—On the opening of navigation in 1904, the cylindrical gas buoy theretofore moored on the west side of the channel, at the upper end of the traverse of St. Roch, opposite the Upper Traverse lighthouse, was replaced by a red spar gas buoy; and the cylindrical gas buoy with a slat-work top heretofore moored at the south edge of the South Traverse middle ground, opposite the Lower Traverse lighthouse was replaced by a larger conical-topped buoy with a smaller superstructure. The new buoys stand up better in the swift current.

Point Lévis shoal.—In June, 1904, a gas buoy, numbered 89 B, was established in a position about $\frac{1}{4}$ mile west of Lévis graving dock, to mark the north edge of Point Lévis shoal, River St. Lawrence, in the harbour of Quebec.

The buoy is of steel, cylindrical, painted black, and is surmounted by a red lantern.

The light, elevated 8 feet above the level of the river, is an occulting white light, automatically occulted at short intervals, and should be visible 4 miles.

Point Nicholas.—In June, 1904, the black can buoy theretofore moored off Point Nicholas, marking the lower end of St. Augustin shoal, in the River St. Lawrence above Quebec, was replaced by a black spar gas buoy, numbered 15 Q, moored in the same position.

The light, elevated 12 feet above the level of the river, is an occulting white light, automatically occulted at short intervals.

Trembles shoal.—The gas buoy moored off the southeast extremity of Trembles shoal, above Quebec, which had always given trouble by canting in the current, so that the light could not be seen at any great distance, was improved in the spring of 1904 by substituting, for the spherical buoy previously used, a spar gas buoy, designed to stand upright under all conditions of current.

Point St. Antoine.—In June, 1904, the red conical buoy previously moored on the south edge of Paget bank, off Point St. Antoine, was replaced by a red spar gas buoy, numbered 28 Q, moored in the same position in 5 fathoms water.

The light, elevated 12 feet above the level of the river, is an occulting white light, automatically occulted at short intervals.

Grondines to Ile Bigot.—In September, 1904, thirteen gas buoys were established at important points on the edges of the ship channel between Grondines and Ile Bigot, and in October, the system was extended to Three Rivers by the establishment of six more gas buoys. They are steel spar buoys, showing acetylene gas lights from Pintsch lanterns at an elevation of 13 feet above the water. The lights shown are white lights, automatically occulted at short intervals. The buoys carry their regular numbers in accordance with the system adopted for this portion of the river, as follows:—

No 73Q, Batture du Chêne	replacing a black can.
No 77Q, Batture à Cadieux	" "
No 80Q, Lower end of Cap Charles course	" red conical
No 90Q, Middle of Cap à la Roche curve	" "
No 97Q, Upper end of Cap à la Roche course	" black can
No 107Q, Cap Levrard, (Batture des Belles Filles)	" "
No 110Q, Cap Levrard	" red conical
No 117Q, Upper end of Batiscan course	" black spar
No 123Q, Lower end of Batiscan anchorage	" "
No 129Q, Batture Perron	" "
No 2C, Pointe Citrouille	" red spar
No 15C, Pouillier Carpentier	" black spar
No 21C, Ile Bigot	" "
No 23C, Lower end of Becancour course	" "
No 30C, Lower end of Becancour bend	" red conical
No 39C, Upper end of Becancour traverse	" black spar
No 45C, Opposite Cap Madeleine wharf	" "
No 55C, Ile aux Cochons	" "
No 59C, Upper end of Three Rivers shoal	" "

4-5 EDWARD VII., A. 1905

These nineteen gas buoys, with the new ranges of lights in the same stretch, hereinbefore described, open night navigation through the ship channel between Grondines anchorage and the foot of Lake St. Peter.

Pointe aux Trembles to Longue Pointe.—On October 15, 1904, black gas buoy No 163M, at the lower end of Pointe aux Trembles curve, was removed and replaced by a black can buoy, and black spar buoy No. 167M, marking the middle of Pointe aux Trembles curve, was removed and replaced by a black spar gas buoy. This buoy is located immediately east of the intersection of the alignment of Ile Ste. Thérèse upper range lights with the alignment of the Longue Pointe range lights, and marks the south edge of the channel at the widened curve. The light shown is a white light, automatically occulted at short intervals.

ONTARIO.

NEW AIDS TO NAVIGATION.

Graham.—Range lights established at Graham, on the south side of the Lake of Two Mountains, Ottawa river, were put in operation on October 1, 1904.

At this place a wharf has been built for the accommodation of market boats and a channel dredged by the department of Public Works of Canada from the deep water to the wharf, a distance of about 5,000 feet.

The lights are fixed red, shown from reflector lanterns hoisted on masts, and should be visible 3 miles in the line of range.

The outer range mast stands on the wharf 22 feet from its southeast end, and in front of a storehouse painted gray. The light is elevated 25 feet above the summer level of the river.

The mast is 20 feet high and has attached to it a diamond-shaped slatted beacon 7 feet high by 6 feet wide, facing the channel, to make it more conspicuous as a day mark, the whole painted white.

The back range mast stands at the top of the river bank, 535 feet, S. 54° W. from the front one, and the light is elevated 41 feet above the summer level of the river. The mast is 22 feet high, and has attached to it a diamond-shaped slatted beacon, 9 feet high by 7 feet wide, facing the channel, the whole painted white. The two lights in one lead through the dredged channel up to the wharf.

This work was done under the supervision of Mr. J. M. O'Hanly, assistant engineer, and cost \$74.54.

False Ducks.—A fog alarm, established at False Ducks lightstation, on the north shore of Lake Ontario, near its eastern end, was put in operation on November 12, 1904.

The fog alarm building stands on the lake side of the lighthouse, on the east end of the island. It is a rectangular wooden structure painted white with red roof, with the trumpet projecting from its southerly face at an elevation of 15 feet above the lake level.

The fog alarm consists of a diaphone, operated by air compressed by oil engines. It will give one blast of 4 seconds duration every minute.

The building was erected by days' labour, under the foremanship of Mr. W. A. Archer, afterwards replaced by Mr. M. J. Egan; its cost will appear in next year's public accounts. The machinery was supplied by the Canadian Fog Signal Company.

Niagara-on-the-Lake.—Range lights established at the mouth of Niagara river were put in operation on October 10, 1904.

The front tower stands upon the Niagara Navigation Company's landing at Niagara-on-the-lake, 30 feet back from the edge of the wharf, and 16 feet from its extreme southeast end. It is a square wooden building, with sloping sides, painted white, surmounted by a square, iron lantern, painted red. It is 32 feet high from its base to the ventilator on the lantern.

SESSIONAL PAPER No. 21

The light is a fixed red catoptric light, elevated 30 feet above the level of the lake, and should be visible 7 miles in, and over a small arc on each side of, the line of range.

The back tower stands on the shore, 690 feet S. $21\frac{1}{2}^{\circ}$ E. from the front light. It is a similar building to the front one, but is 45 feet high.

The light, which is also similar to the front light, is elevated 43 feet above the level of the lake, and should be visible 8 miles in, and over a small arc on each side of, the line of range.

The two lights in one, bearing S. $21\frac{1}{2}^{\circ}$ E. lead into the river clear of all obstructions from the bell buoy on the outermost shoal at the entrance.

A diaphone, operated by compressed air, has also been installed as a fog alarm in a building erected for the purpose on the bank of the river, 930 feet westward of the front range tower, and will be put in operation on the opening of navigation in 1905.

The work on all the buildings was done by days' labour, under the superintendence at first of Mr. L. Keller, of Hull, P.Q., and was completed under the superintendence of Mr. J. F. Murphy, of my staff. The expenditure on construction to date has been \$6,386.26.

Port Colborne.—On May 11, 1904, a diaphone, operated by compressed air, was established as a fog alarm in the new lighthouse, lately erected on the outer end of the new breakwater at the entrance to Port Colborne, as indicated in last year's report.

The trumpet of the fog alarm issues from the second story of the tower on the south side at an elevation of 40 feet above the level of the lake. It gives blasts of $4\frac{1}{2}$ seconds duration separated by silent intervals of $53\frac{1}{2}$ seconds.

The machinery was supplied by the Canadian Fog Signal Company, Toronto, at a cost of \$2,400.

Stokes Bay.—Range light buildings have been erected as indicated in last year's report at Stokes bay on the east shore of Lake Huron, and the lights were put in operation on or about the 25th August, 1904.

The front tower stands upon the northwest extreme of the most westerly of the Knife islands, a group of small islands lying $\frac{1}{2}$ mile north of the northeast point of Lyal Island, and stands upon the site of the front one of a pair of day beacons which have been taken down.

The tower is a wooden structure, square in plan, with sloping sides, surmounted by a square, wooden lantern, the whole painted white. It is 33 feet high from its base to the top of the ventilator on the lantern.

The light is a fixed white light, elevated 30 feet above the level of the lake, and should be visible 10 miles in the line of range. The illuminating apparatus is catoptric.

The back tower stands upon the mainland on the east shore of the bay, on the site formerly occupied by the back beacon. It is distant 4,250 feet, N. 74° E. from the front tower.

The tower consists of a skeleton steel frame, square in plan, with sloping sides, surmounted by an inclosed wooden watch room and a square, wooden lantern. The steel frame is painted brown and the woodwork white. The tower is 64 feet high from its base to the ventilator on the lantern.

The light is a fixed white light, elevated 61 feet above the level of the lake, and should be visible 13 miles in the line of range. The illuminating apparatus is catoptric.

These buildings were erected by days' labour, under the superintendence of Mr. W. K. Morris, of Ottawa, and cost \$2,641.12.

Lions Head.—A light has been established on the outer end of the breakwater at the north entrance to Lions Head harbour, Georgian bay.

The light is a fixed red light, shown from a square tubular lantern hoisted on a pole 15 feet high. The light is elevated about 20 feet above the level of the lake, and should be visible 6 miles from all points of approach by water. The illuminating apparatus is catoptric. The total expenditure in connection with the establishment of this light was \$197.16.

Killbear point.—A gas-lighted beacon has been established on the southwest extremity of Killbear point.

4-5 EDWARD VII., A. 1905

The beacon consists of a cylindrical steel gasholder 20 feet high by 4 feet in diameter, painted white, surmounted by a square steel box carrying a lantern, both painted red.

The light shown is a fixed white light, elevated 37 feet above the level of the lake. It should be visible 7 miles from all points of approach by water. The illuminant is acetylene. The light is unwatched.

Providence bay.—A light established at Providence bay, on the south shore of Manitoulin island, lake Huron, was put in operation on the 27th July, 1904.

The lighthouse stands on the extremity of Providence point, the headland on the east side of the mouth of the bay.

It is an octagonal wooden tower, with sloping sides, painted white, surmounted by an octagonal iron lantern, painted red. It is 42 feet high from its base to the top of the ventilator on the lantern.

The light shown is a fixed white light, elevated 43 feet above the level of the lake. It should be visible 11 miles from all points of approach by water. The illuminating apparatus is dioptric of the seventh order.

The light was erected under contract by Mr. J. Candlish Kennedy, of Owen Sound.

Cutler.—The owners of the sawmill at Cutler, at the head of Aird bay, Messrs. Loveland and Stone, have established and will maintain two range lights to lead up to Cutler steamboat wharf. The lights are fixed red catoptric lights, shown from lanterns with reflectors. They should be visible three miles in the line of range.

The front lantern stands on the roof of the red painted freight shed on the outer end of the steamboat wharf. It is elevated twenty feet above the water.

The back light is shown from a day beacon on the granite hill near Mr. Loveland's residence, 435 feet N. 24° E. from the front light. It is elevated about 40 feet above the water. The beacon consists of boards nailed across a mast, with inclined braces at the base, the whole whitewashed.

The lanterns were provided by this Department, and the beacon was erected by the crew of the surveying steamer *Bayfield*. No other expense was entailed on the government.

North Sister rock.—A hand fog horn has been established at this light-station in St. Joseph channel to answer signals from steamers in the vicinity of the station in thick weather.

Shoal island.—A hand fog horn has likewise been provided to this neighbouring station for a similar purpose.

AID DISCONTINUED.

Soulanges Canal.—From the opening of navigation in 1904, the occulting white gas light shown from a lantern on a steel skeleton framework on the east end of the south pierhead at the lower entrance of the Soulanges Canal has been discontinued, and the structure removed, as the establishment of gas buoys and of range lights on the north pier render it superfluous.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

Port Credit.—The lighthouse marking the entrance to this harbour, near the west end of Lake Ontario, has been placed upon a new cribwork block rising 8 feet above the water, and extending above the general surface of the pier. The light is consequently three feet higher than previously, and is elevated 39 feet above the present level of the lake. The building was also generally repaired. This work was done under the superintendence of Mr. J. F. Murphy, of my staff, and cost \$578.

Burlington Channel.—The red and white lantern lights hoisted on a mast on the inner end of the south pier, which were temporarily discontinued last year pending the execution of repairs to the pier, were again put in operation in June, 1904.

SESSIONAL PAPER No. 21

Port Dover.—The front range lighthouse, near the outer end of the west pier at Port Dover, Lake Erie, is being taken down, to be replaced by a new and improved tower.

While the work is in progress the light heretofore shown from the inclosed tower will be temporarily replaced by a fixed white light shown from a seventh order lens lantern hoisted on a pole erected 50 feet outside the site of the lighthouse, or 58 feet from the extremity of the pier, and in the same alignment as the old range.

The temporary light is 25 feet above lake level and should be visible 5 miles from all points seaward.

The work, which includes the construction of a cribwork block for a foundation for the tower, is being done by days' labour, under the superintendence of Mr. J. F. Murphy, of my staff.

Kingsville.—On the opening of navigation, 1904, the back range light at this Lake Erie Station, was changed in colour from white to red. The light now shown is a fixed red dioptric light of the seventh order, which should be visible eight miles.

Elliott point.—On the opening of navigation in 1904, each of the lights of the Elliott point range, located on the southerly prolongation of the axis of the westerly part of the Amherstburg reach of the dredged channel in Detroit river, was moved about 250 feet to the northward and eastward and established, on the southerly prolongation of the axis of the easterly part of the Amherstburg reach of the dredged channel, recently completed in Detroit river. These are private lights, maintained by the Lake Carriers' Association, and mark a channel under improvement by the United States government.

Amherstburg.—On the 7th July, 1904, the Amherstburg front range tower was surmounted by a wooden slatted disc. On the same date the Amherstburg rear range light was exhibited from the new open frame square pyramidal steel tower recently erected which is surmounted by a wooden disc painted red.

The new tower is located 558 feet N. 16° E. from the front tower. These are also private lights, and the improvements were not made by this department.

Fort Malden.—On 6th July, 1904, the wooden towers heretofore marking the Fort Malden range, were replaced by square pyramidal skeleton steel towers. The front tower has a white base and slatted white disc at the top. The rear tower has a red base and slatted red disc at the top. These are likewise private lights. The above three ranges are of use mainly to the heavy draught freighters plying to United States ports, are consequently maintained by the interests controlling those vessels.

Pointe au Baril.—The steel skeleton tower from which the back range light at Pointe au Baril is shown described in last year's report, has been made more conspicuous by having wooden slats painted white fastened horizontally on the side of the open framed tower facing the channel. The trees surrounding, in front, and in rear of the lighthouse have also been cut down, so that the building may be more easily picked up from seaward. The cost of these improvements, made under the supervision of the lightkeeper, was \$104.

Sault Ste. Marie.—On the opening of navigation in 1904, the electric arc lights on the lower ends of the north and south piers of the Canadian canal were changed in colour from the white to green, so as to distinguish them from the white lights along the edges of the canal.

The two lights changed are respectively the most eastwardly light of each of the two rows of arc lights illuminating the canal bank and cribwork approaches.

The masts with day marks, from which fixed red lights were exhibited to mark the axis of the channel leading to the lower end of the Canadian canal have been replaced by open skeleton, galvanized iron unpainted towers, square in plan, with sloping sides, surmounted by square wooden lanterns from which fixed red lights are shown. These lights are much more powerful than those shown from the old masts. The illuminating apparatus in each case consists of a group of three incandescent electric lamps, each of 65-candle power, placed in the foci of paraboloidal reflectors, showing strong beams in, and over a small arc on each side of, the line of range.

4-5 EDWARD VII., A. 1905

On the channel side of each tower there is a diamond-shaped day beacon of slatwork painted white.

The front tower stands on the shore of the bay north of the entrance to the canal, east of Huron and south of Portage streets. It is 62 feet high from its base to the top of the lantern. The light is elevated 63 feet above the level of the water below the canal, and should be visible 2 miles.

The back tower stands on Hudson street, north of Superior street, 1,150 feet N. $35\frac{1}{2}^{\circ}$ W. from the front light. It is 72 feet high. The light is elevated 78 feet above the level of the river, and should be visible 2 miles. This improvement was carried out for this department by Mr. J. C. Boyd, superintendent of the canal.

Coppermine point.—The charge of the light heretofore maintained here by the Algoma Central Steamship Line has been assumed by this department, and the light will hereafter be maintained as a government station.

Kaministiquia river.—In consequence of the erection by the Canadian Pacific Railway Company of a coal unloading and storing plant on the ground formerly occupied by the range lights, on the north shore of the Kaministiquia river, at its mouth, near Fort William, it has been necessary to re-arrange these lighthouse towers.

The front tower has been moved forward 100 feet in the line of range, and now stands on the east end of the timber facing of the coal yard, which forms the north shore of the river at that point, and is close to the water's edge.

It has been raised 12 feet higher than formerly on an open post foundation, and the light is now elevated 42 feet above the water.

The back range light building with dwelling attached, formerly used, has been taken down, and replaced by a skeleton steel tower surrounding a column of lattice-work, which projects 33 feet through the platform on top of the tower, on which a lantern is hoisted and held in place. The total height of the structure is 122 feet and it is painted red.

A daymark near the top of the lantern column consists of a black square, six feet on a side, with a white diamond in its middle.

The light shown from this tower is an incandescent electric light, shown from the focus of a reflector. It is elevated 128 feet above the level of the lake, and should be visible 11 miles in the line of range.

This new tower stands behind the trestles and pockets of the coal plant, by which it is partially hidden from the water. It is distant 1,212 feet S. $67\frac{1}{2}^{\circ}$ W. from the front light.

These improvements, including also the erection of a neat dwelling for the lightkeeper, were made by the C.P.R. Co., in virtue of an agreement with this department, whereby the lighthouse lands were sold to the company subject to an obligation by the company to provide and keep in good order suitable lightbuildings.

Pie island.—This lighthouse has been removed from the point on which it stood near the wharf, on the west extremity of the island, to the second point northward, a distance of about $\frac{3}{4}$ mile. In its new position it is immediately west of Le Paté, the highest part of the island. In its new location it stands 50 feet back from the water's edge and 15 feet above the water.

The light is elevated 34 feet above the level of the lake and should be visible 11 miles from all points of approach, except where hidden by the high land of Pie island, east of it.

The lighthouse is a wooden tower, square in plan, with sloping sides, painted white, surmounted by a square, wooden lantern painted white.

A new dwelling for the lightkeeper has been built. It is a low wooden building painted white and stands 50 feet northeast of the lighthouse.

The work was done by days' labour under the supervision of Mr. W. H. Brunel, Ottawa, and cost \$491 02.

• *Victoria island.*—The lighthouse has been moved from the knoll on which it stood, near the west end of the island, to the extremity of the point at the west end on the north side of the island, a distance of 400 feet S. 61° W. from its former position. This

SESSIONAL PAPER No. 21

work, done on the recommendation of Mr. W. J. Stewart, Hydrographical Surveyor, was carried out by days, labour, under the supervision of Mr. W. H. Brunel, at a cost of \$584.89.

BUOYS AND BEACONS.

Way shoal.—A hydrographic survey was, in October, 1904, made by the undersigned of that portion of the Ottawa river extending from Besserers wharf to the foot of Pitrie island. It has been found that the shoalest water is located at the head of Way shoal immediately below the mouth of the river Blanche. At this point the channel crosses, from the middle of the river to the north shore. To lead into the channel north of Way shoal two day beacons were established on October 25, 1904. They consist of white-washed diamonds nailed to trees. The front one stands on the north bank of the river, 2,550 feet below the mouth of the river Blanche. The back beacon stands 200 feet N. 48° E. from the front one.

Brown Point, Lake St. Louis.—Black spar buoy No. 53*S*, heretofore moored off Brown point, Lake St. Louis, has been replaced by a steel spar gas buoy, painted black, moored in the same position in 12 feet water.

The buoy is surmounted by a Pintsch lantern, and the acetylene gas light shown is a fixed white light.

Port Louis.—A gas buoy has been established on the southwest end of the shoal north of the pier at Port Louis, Lake St. Francis. It is of steel, cylindrical, painted red, surmounted by a conical cage supporting a lantern. It is moored in 9 feet water, and is numbered 21*F*. The acetylene gas light shown is a fixed white light.

South Lancaster.—Red spar buoy No 64*F*, heretofore moored about one mile east of South Lancaster, Lake St. Francis, has been replaced by a steel spar gas buoy, painted red, moored in the same position in 18 feet water.

The buoy is surmounted by a Pintsch lantern, and the acetylene gas light shown is a white light, automatically occulted at short intervals.

Fiddlers Elbow.—The barrel buoy, heretofore moored at the shoal northwest of Wood island, River St. Lawrence, has been replaced by a gas buoy, moored in the same position in 13 feet water. It is of steel, cylindrical, painted red, surmounted by a conical cage supporting a lantern. The acetylene gas light shown is a white light, automatically occulted at short intervals.

Foot of Wolfe island.—A gas buoy, painted red, was in the autumn of 1903 moored at the south end and on the east edge of the cut dredged by the Department of Public Works through the Blanket shoals at the foot of Wolfe island, a short distance below Kingston, Ont., replacing the most southerly of the three red spar buoys previously marking the cut.

The buoy is of steel, cylindrical, surmounted by a conical slatwork topmark painted red, supporting a lantern. The light shown is a white gas light, automatically occulted at short intervals.

Snake island Middle Ground.—A gas buoy, painted black, was in the autumn of 1903 established at the west end of the Middle Ground between Snake island and Seven Acre shoal, replacing the spar buoy painted in red and black horizontal bands formerly maintained there.

The buoy is of steel, cylindrical, surmounted by a cylindrical slatwork topmark painted black, supporting a lantern showing a fixed white gas light.

Toronto.—The Harbour Master of Toronto issued a circular on the opening of navigation in 1904 respecting the positions of the buoys in the approaches to that harbour, which indicated that changes had been made from the previous arrangement of the buoys. A notice to mariners was accordingly issued, describing the present position of all the buoys in both approaches to Toronto.

4-5 EDWARD VII., A. 1905

Port Colborne.—The resident engineer of the Department of Public Works of Canada advised this department on the 3rd September, 1904, that work had been begun upon a new outer breakwater on the southeastern side of the entrance to Port Colborne, and that mariners making the Lake Erie entrance of the Welland canal must, therefore, keep within 600 feet of the eastern end of the western breakwater to be safe from collision with temporary works.

In October a gas buoy was placed to mark the outer end of this breakwater under construction. It is moored 650 feet S. 50° E. from the red light on the outer end of the western breakwater, and is of steel, surmounted by a lantern carried on a pyramidal open steel frame, and inclosed in a steel cage, all painted red.

The acetylene gas light shown is a white light, automatically occulted at short intervals.

Lockerbie rock.—A gas buoy has been established to mark this danger in the approach to Collingwood.

The buoy is moored in 5 fathoms water, 400 feet west of Lockerbie rock. It is of steel, cylindrical, painted black, surmounted by a conical slatwork topmark and a lantern. The light shown is a white light, automatically occulted at short intervals.

Christian island.—A spar buoy painted in red and black horizontal bands has been established on Campana shoal, and a black spar buoy on the east side of the one-fathom spot, $\frac{1}{5}$ mile S. 32° E. from the lighthouse on Bar point, Christian island.

Lone rock.—The bell buoy heretofore marking Lone rock, southern entrance to Waubuno channel, Georgian bay, has been replaced by a combined gas and bell buoy, moored in the same position. The buoy is of steel, painted red, with a cylindrical body and conical top, surmounted by a steel cage supporting a bell and a lantern. The light shown is a white light, automatically occulted at short intervals. The bell is rung automatically at intervals of about 20 seconds by the pressure of the gas from the buoy.

Seguin bank.—The gas buoy heretofore moored at the south end of Seguin bank, Georgian bay, has been replaced by a combined gas and bell buoy similar to that last described except that it is black instead of red.

Three Star shoal.—A steel spar gas buoy, painted red, has been established off Three Star shoal, in the approach to Parry Sound, replacing the red steel conical buoy heretofore moored in 8 fathoms water off the north end of the shoal. The light shown is a white light automatically occulted at short intervals.

Twin rock middle ground.—A steel spar gas buoy, painted red, has been established to mark the middle ground between Hall reef and Twin rock, in the approach to Parry Sound, replacing a red spar buoy moored 50 feet to the westward of the alignment of the Jones island range. The light shown is a white light, automatically occulted at short intervals.

Casgrain rock.—A beacon was built on this danger in the entrance to Aird bay, near Cutler, by the crew of D.G.S. *Bayfield*, in May, 1904.

It consists of a pole twelve feet high with cross pieces nailed to it, standing in a barrel placed on the summit of the rock. The whole of the beacon is whitewashed, to render it more distinguishable at night.

Curran rock.—A buoy, consisting of a petroleum barrel painted white, was in May, 1904, established and will hereafter be maintained by Messrs. Loveland and Stone, of Cutler, Ont., off Curran rock, at the entrance to Aird bay. It is moored in 18 feet water close southward of the rock awash, and should receive a berth of 300 yards.

East end of lake Superior.—When the buoys maintained by this department in the east end of Lake Superior were placed on the opening of navigation in 1904, the spar buoy marking the eastern extremity of Parisian shoal was changed in colour from red to black; the buoy marking the northeast edge of shoal off Sandy islands was

SESSIONAL PAPER No. 21

changed in colour from red to black ; the bell buoy marking Pancake shoal was removed to a new position southwest of Outer Pancake shoal ; and Pancake shoal was marked by a black spar buoy. A complete list of the buoys maintained under contract in this east end of the lake was embodied in a notice to mariners when the above changes were advertised.

Kaministiquia river mouth.—The platform buoy carrying a Wigham lamp, established in 1903, at the outer end of the northern edge of the dredged channel into Fort William, at the mouth of the Kaministiquia river, Thunder bay, was, in October, 1904, replaced by a steel gas buoy painted red, moored in the same position.

The acetylene gas light shown is a white light, automatically occulted at short intervals.

Port Arthur.—On 31st May, 1904, a wooden platform buoy was established in the prolongation of the northeastern edge of the dredged channel into Port Arthur harbour, Thunder bay.

The superstructure of this buoy was capped by a Wigham 31-day lamp which, from a height of 10 feet above the water, exhibited a fixed white light.

In October this buoy was replaced by a steel gas buoy, painted red, showing a white acetylene light, automatically occulted at short intervals.

Mink island reef.—On the 1st June, 1904, a beacon was erected upon the small rock awash, lying between Mink island and the Sisters, in Victoria channel, Lake Superior. It consists of an iron, pyramidal frame, with horizontal wooden slatwork, surmounted by an iron sphere 20 feet above the water, the whole painted brown.

The ironwork was supplied by Alexander Fleck, Limited, of Ottawa, at a cost of \$68.50, and was erected by the crew of the D. G. S. *Bayfield* under Mr. Stewart's supervision.

BRITISH COLUMBIA.

NEW AIDS TO NAVIGATION.

Lennard island.—The lighthouse on this important part of the Pacific coast of Vancouver island, referred to in last year's report, has been completed, and the light was put in operation on the 1st November, 1904.

The lighthouse stands on the summit of the southwest point of the island, where the rock rises about 35 feet above high water mark. It is a wooden building, octagonal in plan, with sloping sides, painted white, surmounted by a metal lantern, circular in plan, painted red. It is 80 feet high from its base to the vane on the lantern. A white wooden lightkeeper's dwelling and outbuildings have also been erected on the island.

The light is a flashing white light, giving a flash every eleven and a quarter seconds. It is elevated 115 feet above high water mark, and should be visible 16 miles from all points of approach, except where obscured by trees on Lennard island. The illuminating apparatus is dioptric, of the first order, and the illuminant petroleum vapour, burned under an incandescent mantle.

The buildings were erected by days work under the foremanship of Mr. George Frost, and the amount expended on this station to date has been \$10,955.69.

Danger reef.—In consequence of the threatened collapse of the wreck of the ss. *Miami*, the light shown therefrom was, on the 1st October, 1904, discontinued, and has been replaced by a similar light shown from a beacon on Danger reef.

The light is shown from a 31-day Wigham lamp. It is a fixed white light, shown from the summit of a small square wooden tower painted white standing on a wooden frame work foundation painted black, the light is elevated 24 feet above high water mark and should be visible 9 miles.

The work was done by the crew of the *Quadra*, and cost \$120.65.

4-5 EDWARD VII., A. 1905

Fraser river bridge.—A railway bridge has been built across the Fraser river at New Westminster, which is provided with a swinging span for the accommodation of vessels.

Rules to be observed by the masters or pilots of all vessels in passing through the bridge have been published, and the lights hereinafter described, have been established to mark the swing span and openings at night :

A red light at each end of the swing protection, and a red light at each end of the swinging span, the latter not appearing when the bridge is closed. A green light on the pier at the south end of the span, showing down-stream only. A green light on the pier at the north end of the span, showing up-stream only. The span is not open, ready for vessel to pass through, until the red lights on the span are seen directly over the red lights on the swing protections.

Seechelt.—A beacon light has been established on White islet, lying off Mission point, and southeasterly from Seechelt peninsula, in the Strait of Georgia, in place of the beacon heretofore marking that danger.

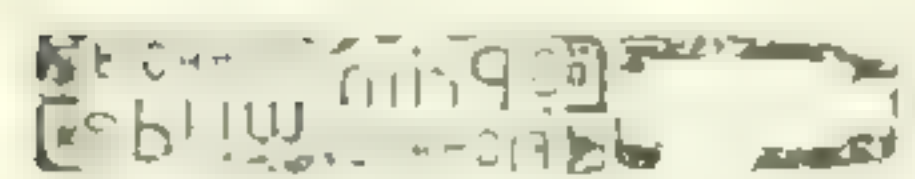
To prevent confusion amongst the numerous geographical features called 'White' this light will be known as 'Seechelt'

The light is an unwatched light, shown from a Wigham 31-day oil lamp standing on a small white inclosed wooden tower, supported on a black wooden framework. The light is fixed white, elevated 36 feet above high water mark, and should be visible 6 miles from all points of approach.

The work was done by the crew of the *Quadra* and cost \$296.80.

Procter middle ground buoy.—On 1st October, 1904, a fixed white light was established, shown from a small lens lantern suspended from the superstructure of the platform buoy marking the middle ground between Procter and Balfour at the entrance to West arm, Kootenay lake, interior of British Columbia.

This light will be maintained whenever the water in the lake is so low as to make the middle ground a danger to navigation. The light is elevated about 6 feet above the water, and should be visible 2 miles. DEC 6



BUOYS AND BEACONS.

Village point.—The red spar buoy heretofore moored in $4\frac{1}{4}$ fathoms off Village point, Baynes sound, has been replaced by a steel conical buoy, painted red.

Browning passage.—A black spar buoy has been established in 5 fathoms water on the north side of Browning passage, to show the extent of the shoal ground, and a red spar buoy in 5 fathoms on the south side to show the northerly extent of the shoal on that side.

Hecate passage.—A platform buoy, carrying a wooden slatwork pyramid surmounted by a drum, the whole painted black, has been established in 5 fathoms water off the south extreme of North bank, Hecate passage, Clayoquot sound, and a platform buoy, carrying a wooden slatwork pyramid, surmounted by a ball, the whole painted red, at the eastern entrance of Hecate passage, to mark the rock that dries. The buoy is moored in 5 fathoms water. The rock dries about one foot at an extreme low water, and is marked by kelp.

First Narrows.—The east beacon, marking the edge of the shoal ground, north side of First Narrows, entrance to Vancouver harbour, having been carried away, has been replaced by a similar beacon placed in the same position. It is a dolphin consisting of five black piles braced together at the head, surmounted by a white triangle, apex down. It dries at low water.

The two beacons maintained by the city of Vancouver to mark and guard the waterworks supply pipes, being sufficient aids to navigation in marking the extent of the shoal ground in that vicinity, the beacon one cable to the westward of the westernmost water pipe beacon, which has disappeared, will not be replaced.

SESSIONAL PAPER No. 21

The west beacon has been discontinued, and a new beacon erected $2\frac{1}{2}$ cables N. 74° W. from the position formerly occupied by the old beacon. It consists of five black piles, braced together at the head, and surmounted by a white slatwork square, and stands in 9 feet of water.

Escape reef.—A pyramidal wooden beacon, 12 feet square at the base, surmounted by a staff carrying a latticework drum 8 feet high and 8 feet in diameter, the whole painted white, and showing 20 feet above high water mark, has been erected on Escape reef, Stuart channel.

The reef covers 4 feet at high water. The beacon stands on a bed of concrete 2 feet deep. The work was done by the crew of the *Quadra* at a cost of \$87.20.

Gibsons landing.—The beacon on the north extreme of the shoal, $2\frac{3}{4}$ cables east of Gibsons landing, Shoal channel, having been destroyed, a new stone beacon, surmounted by a staff and latticework ball, has been erected on the site of the old one.

The masonry is 12 feet above the rock and shows 3 feet at high water. The masonry is painted black, and the staff and ball are painted white. The whole shows 15 feet above high water.

Rock point reef.—A spar buoy, painted red, has been established off Rock point, which is the point midway between Gower point and Mission point, in the Strait of Georgia, to show the extent of the reef eastward of Rock point. The buoy is moored in 6 fathoms water.

Baynes sound.—A wooden triangle, painted red, has been placed on top of the steel conical buoy moored off Reef point, to serve as a distinguishing mark in foggy weather.

Hornby island wharf.—A black spar buoy, moored in 3 fathoms water, has been established off Hornby island wharf, close southward of a reef that lies to the westward of the wharf.

Whaleton bay.—A spar buoy, painted red, has been established on the rock lying off the entrance to Whaleton bay, Cortes island. The buoy is moored in $5\frac{1}{2}$ fathoms water.

Tattenham ledge.—A black platform buoy, moored in $4\frac{1}{2}$ fathoms water, was, in January, 1904, established on the north extreme of Tattenham ledge, east Thormanby island. In August this was replaced by a black spar buoy.

Nelson rock.—A day beacon has been erected on Nelson rock, Malaspina strait, one mile S. 62° W. from Fearney point, Nelson island.

It consists of a frustum of a square pyramid in stonework, 14 feet square at the bottom, 9 feet at the top, by 16 feet high, surmounted by a wooden staff carrying a lattice work drum 6 feet high by 6 feet in diameter; the whole painted black, and showing 26 feet above high water.

Kelp bar.—On the 21st December, 1903, a bell buoy of United States government pattern was established off the eastern entrance to the crossing over Kelp bar.

The buoy is of steel, painted red, and is surmounted by a bell rung by the motion of the buoy on the waves.

It is moored in 25 fathoms, $5\frac{1}{2}$ cables outside the outer spar buoy in the crossing.

Texada island.—A black spar buoy was in August, 1904, established off the north point of Texada island, in 6 fathoms water.

Atrevida reef.—A spar buoy, painted red, was, in August, 1904, established in $5\frac{1}{2}$ fathoms water, to mark the western extremity of an unsurveyed reef, named Atrevida reef, lying off the mainland coast of British Columbia, northward of Harwood island.

Watson rock.—The beacon marking this danger at the western entrance to Grenville channel was carried away by storm in November, 1903. It was rebuilt in July, 1904.

The new beacon is placed on a stone foundation 12 feet square and 3 feet above high water. The beacon is a pyramidal structure painted white, surmounted by a latticework drum painted red. The beacon shows 22 feet above high water.

The whole respectfully submitted,

WM. P. ANDERSON,
Chief Engineer

1st December, 1904.

(INCLOSURE B.)

LIST of Buoys maintained by the Department of Marine and Fisheries in Canadian Waters in 1904.

ONTARIO AND PORTIONS OF QUEBEC IN ONTARIO LIGHTHOUSE DISTRICT.

	No. of buoys.		No. of buoys.
Amherstburg, including Bois Blanc.....	44	Pancake shoal, bell-buoy.....	1
Bar point, gas buoy	1	Parry Sound.....	27
Bay of Quinte (three contracts).....	32	" gas-buoys (one with bell).....	3
Bears Rump.....	1	Pelee middle ground.. ..	3
Big Duck island, bell-buoy.....	1	Pembroke.....	20
Byng inlet.....	7	Pointe au Baril, beacons.	15
Collingwood.. ..	14	" buoys.....	4
Clapperton channel.....	9	Penetanguishene.....	10
Georgian bay	13	Port Arthur	1
Goderich.	2	Port Rowan.....	10
Green shoal.....	1	Rainy river, beacons, pairs.....	11
Grecian shoal.....	1	" buoys.....	14
Grubb reef, gas-buoy.....	1	River Thames.....	7
Hawkesbury	16	Rondeau.....	6
Kaministikwia.....	20	St. Lawrence riv., Montreal to Kingston, spars	144
Lake Erie, maintained by <i>Petrel</i>	3	" " can-buoys	13
Lake Nipissing.	32	" " gas-buoys	27
Lake of the Woods, including bell-buoy	115	Ste. Placide, stakes and buoys.. ..	52
Lake Simcoe.. ..	12	Sault Ste. Marie.. ..	20
Lake Superior, including bell-buoy.....	7	" canal approaches	25
Little Current	8	Seine river and Grassy lake, piles....	30
Lone rock, gas and bell-buoy.	1	" buoys.	10
Midland.....	7	South Baymouth	4
Murray canal and Presqu'ile bay	23	Stokes bay.....	6
Napanee	14	Surprise shoal, bell-buoy.. ..	1
Niagara, bell-buoy	1	Trenton	11
North Sisters rock.....	4	Victoria Island, Lake Superior.....	3
Orillia.....	9	Waubashene.....	37

QUEBEC.

Agnes.....	1	Grand Entry.....	14
Amherst harbour.....	8	Griffin cove	1
Bonaventure.....	1	House harbour, Magdalen islands.....	6
Cap Chat.....	1	Lake St. John—	
Cape Cove.....	1	River Ashuapmuchuan.....	68
Cap Meule.....	1	" Mistassini	120
Carleton point.....	1	" Peribonka.. ..	24
Chicoutimi.....	15	Roberval harbour.....	3
Cock point.....	1		215
Chaudière basin.....	7	Little river west	1
English bay.....	3	Maria	1
Eschourie rock.....	1	Matane.....	3
Fox river.....	1	Mont Louis.. ..	1
Gaspé	5	New Richmond	3

SESSIONAL PAPER No. 21

List of Buoys maintained by the Department of Marine and Fisheries, &c.—*Continued.*QUEBEC—*Concluded.*

	No. of buoys.		No. of buoys.
North channel, Island of Orleans.....	12	St. Thomas.....	8
Nouvelle.....	1	St. Lawrence river between Quebec and	
Paspebiac.....	1	Montreal, gas buoys.....	40
Pentecost.....	1	St. Lawrence river between Quebec and	
Percé.....	2	Montreal, unlighted buoys.....	214
Port Daniel.....	1	Serpent reef.....	1
Restigouche river.....	10	Maintained by Quebec agent below Quebec,	
Richelieu rapids, balises.....		gas-buoys.....	22
" river, to St. Johns.....	35	Maintained by Quebec agent below Quebec,	
" " above St. Johns.....	19	unlighted buoys.....	49
Rivière à la Pipe, Lake St. John.....	8	Maintained by Quebec agent below Quebec,	
" des Prairies.....	10	bell buoy.....	1
Ste. Adelaide de Pabos.....	1	Maintained by Quebec agent below Quebec,	
Ste. Anne river.....	1	whistling buoy.....	1

NOVA SCOTIA.

Advocate harbour.....	6	Margaree harbour.....	9
Apple river.....	8	Merigomish.....	6
Arichat.....	21	Marie Joseph.....	5
Argyle river and sound.....	10	Montsellier.....	10
Avon river.....	6	McKinnon harbour.....	4
Barrington.....	52	Musquodoboit.....	7
Bear river.....	12	Northport.....	12
Beaver harbour.....	2	North Sydney.....	5
Blandford.....	5	Parrsboro.....	6
Bridgewater.....	10	Petitdegrat.....	11
Canning or Habitant river.....(6 dolphins)		Pictou.....	6
Canso and St. Andrews passage.....	30	Popes harbour.....	3
Cape Negro or North-east harbour.....	17	Port Felix.....	7
Cariboo.....	6	Port Hood.....	7
Chester.....	25	Port Le Tour.....	12
Cheticamp.....	12	Port Medway.....	9
Chezzetcook and Petpiswick.....	6	Port Morien.....	2
Christmas island and Barra strait.....	11	Port L'Hebert.....	12
Clarks cove, West bay.....	3	Pubnico.....	18
Clarks harbour.....	17	Pugwash.....	9
Cockerwit pass and Woods harbour.....	20	Prospect, Lower.....	10
Cooks cove, Toby cove.....	4	Queensport.....	3
Canning river.....	6	River John.....(stakes).	3
D'Escousse and Lennox passage.....	27	Roseway.....	3
Digby and Annapolis.....	13	St. Anns.....	3
Dover.....	4	St. Mary river.....	8
East bay, Bras d'Or.....	2	" up to Sherbrooke.....	18
Great Bras d'Or.....	7	St. Peter bay.....	16
Gillis point, Boulaceet.....	1	St. Peters inlet.....	10
Guysborough.....	3	Sambro.....	11
Hay cove.....	8	Shag harbour.....	13
Harbour au Bouche.....(6 stakes).	4	Sheet harbour.....	9
Ingonish, South bay.....	8	Shelburne.....	10
Isaacs harbour.....	12	Ship harbour.....	9
Indian harbour.....	4	Ship rock.....	1
Jeddore.....	9	Shulee.....	8
Judique.....	1	Smith island.....	1
Ketch harbour.....	6	Sydney.....	2
L'Ardoise.....	3	Tanger.....	4
Lahave.....	8	Tatamagouche, 46 stakes and.....	18
Little narrows.....	10	Terrence bay.....	3
Little Dover.....	9	Tor bay.....	19
Little Bras d'Or.....	2	Three Fathom harbour.....	5
Liverpool.....	3	Tidnish.....	5
Lockeport.....	6	Tusket (two contracts).....(3 spindles).	23
Lunenburg.....	9	Upper Prospect.....	4
Lunenburg, back cove.....	9	Wallace.....	11
" middle south.....	16	West bay.....	3
Louisburg.....	7	West Dublin and Crooked channel.....	13
Mabou.....	12	Westport.....	3
Mahone bay and Chester.....	12	Weymouth.....	13
Main-à-Dieu.....	6	Whitehead.....	9

4-5 EDWARD VII., A. 1905

LIST of Buoys maintained by the Department of Marine and Fisheries, &c.—*Continued.*NOVA SCOTIA—*Concluded.*

	No. of buoys.		No. of buoys.
Yarmouth.....	50	Maintained by agency (conical and can-buoys).	150
Maintained by agency..... (whistling-buoys).	33	" " (gas-buoys).	3
" " (bell-buoys).	26		

NEW BRUNSWICK.

Bathurst.....	26	Musquash.....	7
Baie Verte and Port Elgin	36	Neguac.....	21
Bay du Vin	7	Neil harbour.....	1
Beaver and Blacks harbour.....	9	Napan river, 24 stakes and.....	3
Black brook, Miramichi river.....	3	Northwest arm, Miramichi.....	6
Black Lands gully.....	12	Oromocto.....	7
Buctouche.....	16	Ox island, St. John river.....	5
" stakes.....	32	Petit Rocher.....	2
" river, bushes.....	200	Pisarinco.....	2
Bartibogue.....	13	Pokemouche.....	8
Campobello, 1 spindle and.....	9	Richibucto and Albion.....	28
Caraquet.....	21	" Rexton and Browns yard.....	30
Cocagne, stakes, 50.....	11	Shediac	11
Dalhousie and Restigouche.....	12	" north of island, 26 bushes and.....	2
Digdequash.....	5	Shippigan, 17 pickets....	20
Dipper harbour.....	3	St. Andrews.....	15
Dorchester.....	3	St. Croix ledge	11
Grande anse.....	4	St. John river, 155 stakes and.....	68
Grand lake and Salmon river, bushing:.....	73	St. Louis, 15 bushes.....	10
Grand Manan, 1 spindle and.....	28	South Tracadie gully, 30 bushes and.....	5
Great Shemogue.....	7	Tabusintac.....	18
Hatfield Point, bushes.....		Tracadie, 150 bushes.....	19
Harvey	7	Tynemouth creek.....	3
Kouchibouguac and Black river, bushes.....		Washademoak, 147 bushes and.....	2
Lepreau	3	Waweig River.....	1
Letite and Back bay, 1 spindle and.....	14	West Isles, 4 spindles and.....	23
Little Shemogue, 1 beacon and,.....	5	Maintained by agency	
Little Shippigan.....	12	" " (can and conical-buoys).	17
Magaguadavic.....	13	" " (whistling-buoys).	10
Maquapit and French lakes, 20 stakes and...	4	" " (bell-buoys).	11
Miramichi.....	18		

PRINCE EDWARD ISLAND.

Bay Fortune.....	3	Little channel.....	3
Beach point.....	3	Montague.....	6
Bedeque.....	11	Murray harbour, 2 stakes.....	37
Brae harbour.....	5	New London.....	9
Cardigan, Lower.....	6	Orwell and Vernon river, 36 bushes.....	6
" Upper.....	16	Pinette.....	5
Cascumpec, 12 stakes..	14	Port Hill.....	12
Charlottetown, 20 stakes.....	22	Pownal.....	7
Cove head.....	2	Rollo bay.....	3
Crapaud, stakes and.....	5	Rustico.....	5
East river (Hillsboro').....	17	Savage harbour.....	2
Egmont bay.....	12	Souris.....	4
" south, 8 stakes and.....	2	St. Peters harbour.....	8
Georgetown.....	13	Summerside....	11
Goose harbour.....	2	Tracadie.....	3
Grand river, 1 beacon and.....	12	West point.....	1
" lot 14.....	8	Wood island.....	4
Indian rocks.....	1	Maintained by agency..... (signal-buoys).	3
Malpeque	16	" " (can and conical).	15
Miminegash	6		

SESSIONAL PAPER No. 21

LIST of Buoys maintained by the Department of Marine and Fisheries, &c.—*Concluded.*

BRITISH COLUMBIA.

BUOYS.

	No. of buoys.		No. of buoys.
Alford reef, steel can.....	1	Hodgson reef, steel can.....	1
Barkley sound, Sutton rock, platform.....	1	Horswell reef, steel can.....	1
Baynes sound, spar.....	3	Indian reef, steel can.....	1
" steel conical.....	3	Johnstone reef, steel can.....	1
" bell.....	1	Kootenay lake, platform.....	14
Benmohr rock, platform.....	1	" spar.....	2
Burnaby shoal, spar.....	1	Ledge point, spar.....	1
Celia reef, steel conical.....	1	Malaspina strait, spar.....	3
Clarke rock, platform.....	1	Metlahcatlah, platform.....	2
Clayoquot sound, platform.....	4	Nanaimo, platform.....	5
" spar.....	3	" steel platform.....	3
" steel can.....	1	" spar.....	2
Colborne passage, platform.....	2	Passage rock, platform.....	1
Cortes island, steel can.....	1	Point Grey, steel can.....	1
Dall patch, platform.....	1	Portier pass fairway, steel can.....	1
Departure bay, platform.....	2	Rock point reef, spar.....	1
Dorcas rock, spar.....	1	Rosedale rock, steel can.....	1
Entrance point, Satellite channel, steel conical	1	Rosenfelt reef, steel conical.....	1
Esquimalt, spar.....	1	Sidney channel, steel can.....	2
" platform.....	2	" steel conical.....	1
False narrows, spar.....	2	" spar.....	2
False reef, steel can.....	1	" platform.....	1
First narrows, spar.....	1	Snake island, steel conical.....	1
Fraser river, Sandheads, bell.....	1	Sparrowhawk rock, platform.....	1
" " steel conical.....	14	Tugwell reef, spar.....	1
" " spar.....	2	Victoria harbour, platform.....	2
" North arm, buoyed by P.W.D.,		Victoria rock, steel can.....	1
number not known.		Virago rock, spar.....	1
Ganges harbour, steel can.....	2	Welcome point, spar.....	1
Gossip reef, steel can.....	1	Whaleton bay, spar.....	1
Governor rock, steel platform.....	1	White rock, Trincomali channel, steel can...	1
Grappler reef, steel can.....	1		
Hazel point, spar.....	1		

UNLIGHTED BEACONS.

	No. of beacons.		No. of beacons.
Atkins reef, masonry.....	1	Maple spit, dolphin.....	1
Base flat, pile.....	1	Mud bay, including Slue, Serpentine and	
Canoe rock, masonry.....	1	Nicomeck'l, piles.....	40
Channel rock, iron spindle.....	1	Nanaimo harbour, beacon rock, masonry...	1
Dyke point, wooden.....	1	Nelson rock, masonry.....	1
Enterprise reef, masonry.....	1	North reef, wooden.....	1
Escape reef, wooden.....	1	Parthia shoal, masts.....	2
False narrows, piles.....	2	Regatta rock, wooden pyramid.....	1
First narrows, Burrard inlet, dolphins.....	2	Romulus rock, wooden.....	4
" " waterworks beacons		Shark spit, dolphin.....	1
maintained by corporation of Vancouver..	2	Shrub, masonry.....	1
Fraser river, Sandheads, dolphin.....	1	Shute rock, masonry.....	1
" North Arm, piles maintained by		Sidney spit, wooden.....	1
by P. W. D., number not known.....		Somas river, dolphins.....	3
Gabriola reef, masonry.....	1	Sooke, dolphins.....	4
Gibsons landing, masonry.....	1	Spanish bank, dolphin.....	1
Goose spit, wooden pyramid.....	1	Union spit, pile.....	1
Grassy point, pile.....	1	Watson rock, wooden pyramid.....	1
Kelp bar crossing, marked trees.....	2	White point, wooden triangle.....	1
Kelp reef, masonry.....	1	White stone, wooden.....	1
Ladysmith, dolphins.....	2	Zero rock, masonry.....	1
Lewis rock, masonry.....	1		

APPENDIX No. 2.

ANNUAL REPORT OF THE COMMISSIONER OF LIGHTS.

To the Deputy Minister
of Marine and Fisheries.

SIR,—I have the honour to submit the first annual report of this branch, to November 30. By Order in Council of November 5, 1903, and departmental memorandum, the work of the operation and maintenance of the aids to navigation were assigned to this Branch, including the provision and installation of illuminating apparatus and lanterns; while the construction and repairs which form a large proportion of the work of the department, are dealt with by the chief engineer.

A division of work on the lines indicated above, follows the practice of the different railway systems and of large industrial concerns.

At the same time, Mr. W. H. Noble, who had been for many years on the staff of the chief engineer, was appointed assistant commissioner of lights.

During the past year progress has been made in different directions. The most important improvements carried out, or under way are:—

1. The establishment of a central lighthouse depot at Prescott, Ont., to furnish illuminating apparatus and lanterns for the lighthouse service.
2. The extension of the gas buoy service in the ship channel between Grondines and Port St. Francis.
3. The adoption of an automatic acetylene buoy which will permit the use of gas buoys at points where a supply of compressed gas could not readily be obtained.
4. The introduction of a system of submarine signalling
5. The improvement of the existing fog alarm plants by the substitution of diaphones, for horns and whistles.

And in addition to the above, consideration has been given to a scheme for the relighting of the more important points on the Gulf and River St. Lawrence and Atlantic sea-board.

Reference is made below to certain of the changes and improvements outlined above.

Owing to the fact that the operation and maintenance of the Aids to Navigation is separated from the construction and repair of the same, and that at present, the superintendents of lights carry out under instructions from headquarters, construction work, it is desirable that an engineer be appointed for each agency who would thus relieve the superintendents of the technical work, and permit them to more effectively perform work of their inspection and supervision.

A large percentage of the buoyage throughout the Dominion is done by contract, and owing to the fact that the buoyed areas in any given locality are often separated by considerable distances, and the fact that the buoys have frequently to be placed almost simultaneously, this prevents the department in many cases from undertaking this work.

The tendency, however, of late years, has been to take over the more important contracts and carry on the work by the department's officers.

The buoy contract system of the department is under the charge of Mr. Stumbles, who has devoted to it a great deal of attention and care.

In order to have the greatest possible efficiency with the contract system, it will be necessary to increase the inspection given to it.

The question of illuminants for the larger lights received consideration during the past year, but the results were not conclusive owing to the fact that the necessary photometric apparatus had not arrived. The experiments will be continued during the

SESSIONAL PAPER No. 21

coming year. Experiments will be carried out with English, German, French, and Canadian petroleum vapour lights, incandescent acetylene mantle lights, and naked acetylene flames of various sizes.

In addition to the improvement in the lights between Montreal and Kingston contained in the list below, the following lighthouses were changed in colour to bright red, to render them more distinctive, viz.—Matane, Martin River, and Little Metis.

The occulting mechanism at Bird Rocks, Gulf of St. Lawrence, broke down, and notice was given that the light would be fixed white until a new clockwork machine could be installed. This has arrived in Quebec.

The siren formerly maintained at Father Point, was changed to a diaphone operated by compressed air and during thick or foggy weather gives two blasts of $2\frac{1}{2}$ seconds duration each every two minutes as follows:—

Blast	.....	$2\frac{1}{2}$ seconds
Silent	.....	$2\frac{1}{2}$ "
Blast	.....	$2\frac{1}{2}$ "
Silent	.....	$112\frac{1}{2}$ "

The illuminant of the Gannet rock light has been changed from coal oil to a three mantle incandescent petroleum vapour light.

The illuminant at Partridge island has been changed from coal oil to a three mantle incandescent petroleum vapour light.

MONTREAL—KINGSTON DIVISION.

Lighthouses and lightships burning acetylene in 1904.

Location.	Colour.
On pier at entrance Lachine canal	White 1
" " "	Red 1
Lachine range lights	Oclt. 2
Lachine lightship No. 1	Red 1
" " No. 2	White 2
" " No. 3	" 3
Dorval	" 1
Point Clair	" 1
Caron point	" 1
Isle Perrot	" 1
Light on piers S. E. of St. Annes	" 2
Beauharnois range lights	" 2
Grosse Pt. or Valleyfield main light and range lights	" 4
Coteau landing	" 1
McKay point	" 1
Cherry island	" 1
Lancaster bar	" 1
Lancaster	" 1
St. Francis Middle Ground	Red 1
Hamilton's island	White 1
Glengarry point	" 1
St. Regis Dyke range lights	" 2
North Channel dyke	Red 1
Windmill point	White 1
Cole shoal	" 1
Grenadier island	" 1
Lindoe island	" 1
Gananoque narrows	" 1
Jackstraw shoal	" 1

4-5 EDWARD VII., A. 1905

Location.	Colour.
Spectacle shoal.....	White 1
Red Horse rock.....	" 1
Burnt island.....	" 1
Wolfe island.....	" 1
Brown's point.....	" 1
Snake island.....	Red 1
Center Brother's island.....	White 1
Total.....	43

The following lights will be converted on the opening of navigation, viz.—

St. Anicet.....	1
Nine Mile point.....	1
Dickinson's Landing.....	1
Total.....	3

DOMINION LIGHTHOUSE DEPOT.

In the annual report for the last year, it was stated that the department had purchased a property at Prescott, known as the Labatt brewery, and had established at that point a Dominion Lighthouse Depot, where special apparatus for the lighthouse service could be made and distributed. It was also mentioned that the headquarters of the Montreal-Kingston buoy service would be located at the same point.

Since November, 1903, improvements have been carried out to fit the depot for the work to be done. The property has been fenced in, and recently the lot on the North east corner known as the Buckley lot, acquired. The surface has been graded, the C.P.R. siding from the Imperial Starch Works, carried into the depot, and the two main buildings (formerly the brewery 50 x 172 ft. and the malt house 36 x 136 ft.) converted into storage buildings. There is, in addition, a blacksmith shop and gas pumping station 40 x 67 ft. The water front has been dredged to a depth of 14 feet extreme low water south and east of the present deep water wharf.

A carpenter shop 35 x 50 ft., boiler house 25 x 32 ft., pump house 14 x 18 ft., gas testing house 35 x 35 ft. and a tool store room 20 x 35 ft., have been erected, while the temporary machine shop 20 x 35 ft. was transferred from the former depot at Morrisburg.

The area of the property is now 3.51 acres, and in order to complete the water front it is recommended that it be carried out to the line of the south face of the present deep water wharf, on the southwest corner of the property, and that a slip 80 ft. wide be left at the eastern side to haul out boats or scows. This would increase the area to 4.26 acres.

In addition to this, a basin should be built from the southwest corner of the deep water wharf by running a pier south from 80 to 100 ft. and thence easterly or parallel to the face of the property, a distance of about 400 ft.

In addition to the routine work of the depot there was constructed during the past year a small repair scow 20 by 40 ft. with derrick and hand hoist to be used as required in the repair of cribs, &c.

A catamaran sweep 54 x 70 ft. was also built for service below Quebec. This sweep is modelled on the lines of the one built for the Harbour Commissioners of Montreal, and carries two sweeping bars of steel 36 ft. long and 7" diameter.

The gas and derrick scow *Acetylene* was completed sufficiently before the close of navigation to be sent to the ship channel division to assist in the lifting of the buoys, and she will be completed during the winter. The dimensions are 26 x 90 ft. and the scow is provided with a steel derrick, three drum hoist, steam capstan and complete gas generating and compressing plant.

SESSIONAL PAPER No. 21

A derrick scow, *Prescott* was also built 24 x 65 ft. and is used in connection with the D.G.S. *Reserve* to attend to the general buoy service. She has a wooden derrick and steam hoist. Provision is made for the utilization of this scow as a steam pile driver and removable spuds may be attached at the forward end.

As indicated above, the *Scout*, *Reserve*, *Prescott* and *Viator*, make their headquarters at the depot. The latter launch has recently been turned over to the Hydrographic Survey.

After the close of navigation, the house boat *Lotbinière* and launches *Arrow* and *Viator* of the Hydrographic Survey, and the D.G.S. *Maisonnette* and *Reserve* were hauled out for inspection and necessary repairs.

A large sum of money may be spent within the next few years for lanterns and optical apparatus for the lighthouse service and there is no good reason why the lanterns and the revolving mechanism should not be made in Canada. This would necessitate the purchase of the lenses abroad, and it is doubtful if it will ever be practicable to do that class of work in the country.

The undersigned cannot too strongly urge the completion of the depot to undertake this class of work. Besides retaining within the country the money which would be otherwise sent out, it trains a staff of mechanics acquainted with lighthouse work which is of value to the lighthouse service generally.

ACETYLENE LIGHTING.

Reference was made in the last annual report of the department, to the inception and progress of acetylene in the lighthouse and gas buoy service, up to December 31, 1903. In that report it was stated in effect that the initial experiments proved that acetylene was superior to oil gas as an illuminant for gas buoys (and beacons) for the following reasons, viz.:—

1. For an equal volume of gas burned, the acetylene gave more than five times the candle power ;

2. The acetylene could be made as required in a portable gas apparatus on the deck of a lighthouse tender, whereas oil gas had to be transported in holders from a central gas plant ;

3. More acetylene could be compressed into a gas buoy (or beacon) of given size than oil gas, owing to the fact that acetylene is a definite chemical compound, while oil gas is a mixture of several gases. The acetylene does not condense or liquify at ordinary working pressures while beyond 10 atmospheres (150 lbs.) oil gas begins to deposit liquid hydrocarbons. There is a difference of 5 atmospheres or 75 lbs. in favour of acetylene which in an average gas buoy (170 cu. ft. per atmosphere) means an additional gas content of 850 cu. ft.

The original difficulty experienced with the burners was noted, and it was stated that a satisfactory result had been obtained by the use of a half foot 'economic' tip, and further that an occulting burner had been devised, which was in service during the past season.

Progress has been made in the arrangement of the burners, and for fixed lights, twin tips are used $\frac{1}{4}$ ft. size, while the flashers for the occulting lights carry twin main tips $\frac{1}{4}$ ft. and twin pilots. The consumption of gas is for all practical purposes the same as if a $\frac{1}{2}$ foot burner had been used and the result has been excellent. Experiments are now under way at the Dominion Lighthouse Depot, which it is thought will go much farther towards solving the burner difficulty. As the matter stands, the results are satisfactory and the acetylene buoy service has been a success.

No change has been made in the general design of the generating and compressing apparatus but the capacity of some of the units has been altered. An 'after dryer' has been added to the compressing plants and at present, the acetylene passes from the generator through a scrubber filled with water, thence through a 'fore dryer' and strainer to the compressor, and after passing the after dryer, through the after cooler to the buoy or lighthouse.

4-5 EDWARD VII., A. 1905

An inspection of the Canadian Pacific Railway acetylene pumping station at Toronto led to the adoption of duplicate compressors under certain conditions.

The department has tested and approved an automatic gas buoy which carries its own charge of carbide, and as the development of this invention revolutionizes acetylene gas buoy practice, it has had a far reaching effect in altering the plans of the department for extensions of this service.

The buoy in question is the invention of Mr. Thomas L. Willson, of Ottawa.

The advantages of this buoy over the compression type are numerous and important, viz. :—

1. In the compression type the gas is raised to pressure of 225 lbs. per sq. inch ; in the automatic type the maximum pressure does not exceed a few lbs. per square inch ;

2. Compression buoys require for their maintenance a generating and compressing plant. In the case of acetylene this could be placed on the deck of a lighthouse tender or scow ; with oil gas it had to be located on shore and the gas transported in holders to the buoy ;

3. The elimination of compression and the fact that automatic buoys may be recharged from a small boat, if necessary, permits the installation of gas buoys in isolated positions where it was not practicable before ;

4. An automatic gas buoy, fully charged, can carry from 9,000 to 10,000 ft. of gas in the form of carbide. The standard compression buoy (170 cu. ft. per atmosphere) at 15 atmospheres will contain about one-quarter as much gas. It is seen that an automatic buoy can be charged on the opening of navigation and requires no attention in so far as gas supply is concerned until navigation closes, or sufficient, if necessary, for one year.

5. The adoption of this principle permits the lighting of other classes of buoys, such as whistling and bell buoys, and in future, buoys of these types will be lighted.

The immediate effect of the successful test of the automatic buoy was the decision to abandon the proposed compression station at Quebec, and in the spring, to dismantle the compressing plant at Halifax. The compression buoys at the latter point and in the Quebec agency, will be concentrated between Platon and Kingston, and they will be replaced by the new type.

Reference is made below to the increase in lighted buoys in the ship channel. During the past season of navigation, these buoys were attended to by the D. G. S. *Scout* until arrangements could be made for an independent service. This was accomplished towards the close of navigation by the launching at the Dominion Lighthouse Depot, of the combined gas and derrick scow *Acetylene*. This scow is 90 by 26 ft. and has a steel derrick and a three drum hoist. Ten gas buoys may be carried on deck. The after end of the scow has a complete duplicate gas plant of the latest type, the compressors being worked from the main boiler. This scow is a valuable auxiliary to the *Shamrock* engaged in the ship channel buoy service and will be able to supply all gas needed in future in the division, and can be used for placing and lifting gas and other buoys.

MONTREAL-KINGSTON DIVISION.

There are 31 gas buoys and 43 gas lights between Montreal and Kingston, an increase of 4 buoys during the past season. All the lighthouses between Montreal and Kingston were lighted by acetylene before the close of navigation with the exception of three.

The services of the keepers of the three lightships in Lake St. Louis were dispensed with and the group of seven lights at the lower end of the lake placed in charge of the keeper of the Lachine lights.

The services of the keepers of the lights at Burnt island, Red Horse rock, Spectacle shoal, and Lindoe island, were dispensed with, and the above named lights, together with the lights at Jackstraw shoal and Gananoque narrows were placed under the keeper of the latter lights.

SESSIONAL PAPER No. 21

The lights at Windmill point, St. Regis dyke, North Channel dyke, Stonehouse point Hamilton island and St. Francis Middle Ground are being operated as unwatched gas lights.

Before the opening of navigation consideration will be given to the question of keepership in this division, and where a number of lights are in one locality it may be advisable to appoint a caretaker, as has been done in the vicinity of Gananoque and Lachine.

SHIP CHANNEL DIVISION.

Platon to Montreal.

Shortly before the close of navigation in 1903, twelve gas buoys were placed between Sorel and Montreal, thus permitting night navigation between these points. During the past season the work of lighting the ship channel from Grondines to Port St. Francis has proceeded and twenty gas buoys have been placed at the salient points of the channel, and the necessary notices to mariners issued.

As intimated above, the *Scout* provided the gas for this service as well as above Montreal, but the gas and derrick scow *Acetylene* will hereafter attend to the buoys in this district.

Quebec Agency.

It was the intention to proceed with the erection of an acetylene gas plant at Quebec, but owing to the introduction of automatic gas buoys this was abandoned, and the compression buoys in this agency will be withdrawn and the latter type substituted.

Halifax Harbour.

A temporary pumping station was erected at the Agency wharf, Halifax, and has supplied the three harbour gas buoys and the light at Mauger's beach.

A small independent installation has been made at Mauger's beach and an acetylene mantle flame substituted for the naked flame heretofore used.

The gas plant will be dismantled in the Spring, and automatic buoys will replace the compression type.

Georgian Bay district.

It is the intention to erect a gas pumping station at some central point in the Georgian bay to provide for the gas buoy service, and pending the erection of the same a number of steel store holders were sent to Parry Sound and drawn upon as required for the gas buoys in the district.

These holders have been distributed to the lights at the entrance to Parry Sound and they were converted before the close of navigation into gas lights.

A gas beacon has been erected at Kilbear point at the entrance to Parry Sound.

GENERAL REMARKS.

The coming season of navigation will see the extension of the gas buoy service to isolated localities. The concentration of compression buoys in one district, the withdrawal of Wigham coal oil buoys from the service, the replacing of Wigham coal oil beacons in British Columbia by automatic gas beacons, the lighting of signal buoys, bell and whistling, and an extension of the use of incandescent acetylene mantle lighting. An automatic gas buoy has been placed at the entrance to Port Colborne, Ont. and two compression buoys replaced two wigham coal oil buoys in the vicinity of Port Arthur, Ont. These latter will be removed in the Spring and automatic buoys substituted.

SUBMARINE SIGNALLING.

Reference was made in your report for the last fiscal year to the subject of submarine signalling, and since that time the subject has been taken up by the officers of your department, reported upon, and this new aid to navigation adopted in Canada on the report of the officials who examined into the matter, and on the recommendation of the lighthouse board. A personal examination of the system was also made by the minister and yourself.

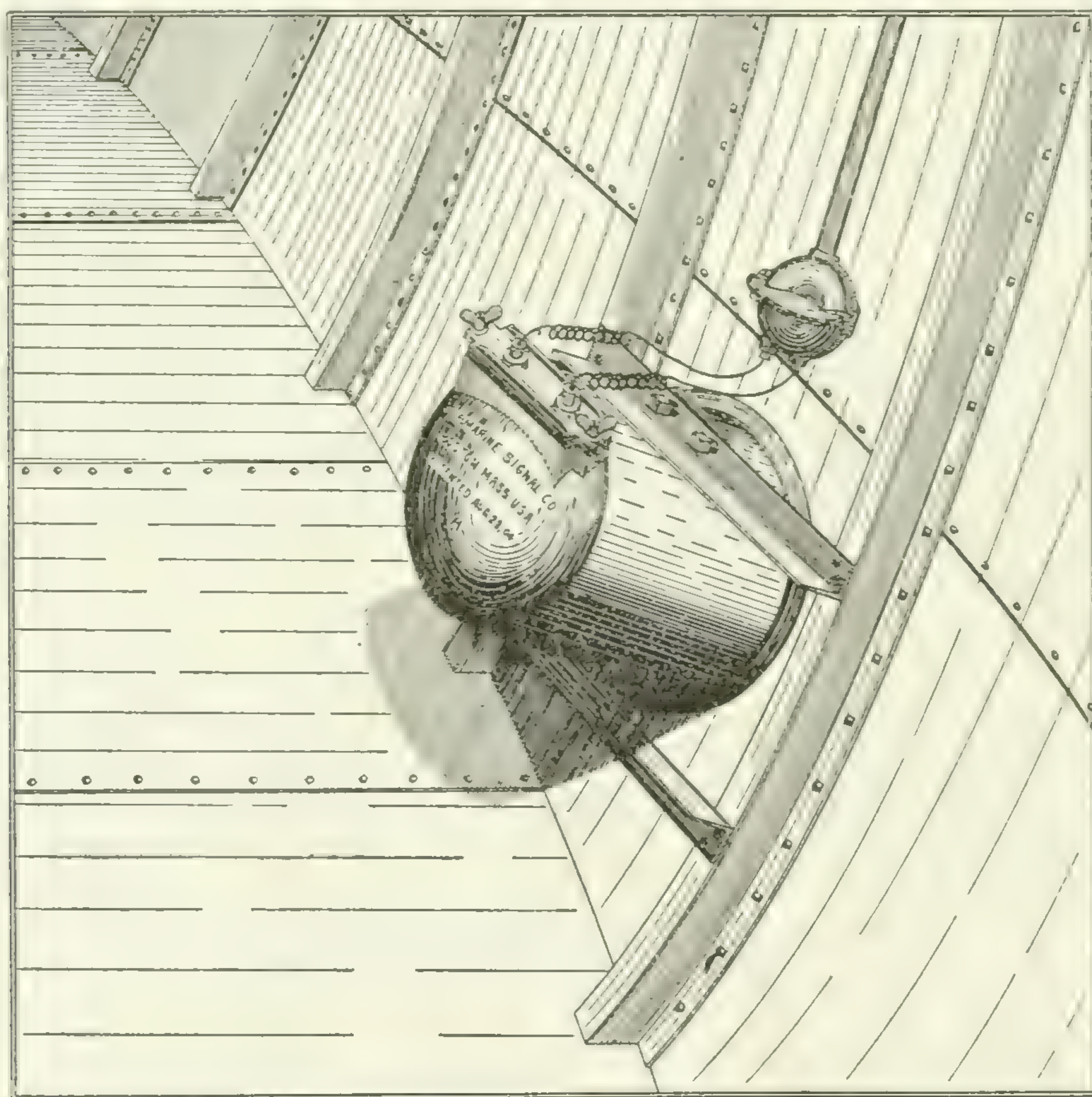
Submarine signalling consists in sending warning signals to ships through the water without the use of wires from :—

1. A lighthouse or other shore station, by means of a bell suspended in the water connected by a cable with the lighthouse or shore station ;

2. By means of a bell on a lightship immersed in the water, and rung either automatically by the motion of the lightship, or mechanically, or electrically.

3. By means of buoys operating bells in the water.

The warning signals sent out are received by ships equipped with 'receiving' apparatus consisting of transmitters, one on either bow of the ship, the impulses received being transferred electrically to the pilot house of the ship to the 'receivers'.



Transmitter clamped to hull of ship.

By means of the receiving apparatus the direction of the signal may be determined within from one-quarter to one point depending on the skill and practice of the observer, and depending also on the distance from the ringing bell.

The distance at which the signal may be heard varies. It depends on the size of the bell and the force with which it is struck. It is dependent also on the composition and shape of the bell, and whether the bell is open or inclosed.

SESSIONAL PAPER No. 21

The bells, similar to those on the United States' lightships between New York and Boston, gave a clear unmistakable sound at five miles, and at times were heard from 10 to 12 nautical miles.

The use of receiving apparatus enables the direction of the signal to be determined, and very largely increases the radius of warning, but in either wooden or iron ships a general warning sound may be obtained by an observer listening with the ear against the hull of the ship, and whether the signal comes from the port or starboard side, can be determined.

The undersigned, in his preliminary examination of this new aid heard the Boston lightship bell at one mile in the hull of a small wooden steam yacht which drew about six feet of water. The engines were stopped.

This system of submarine signalling was invented some years ago by Mr. A. J. Mundy, of Boston, and associated with Mr. Mundy in the experiments, was the late Professor Elisha Gray. At an early stage of the experiments, which were carried out on a scow called the *Sea-Bell* no difficulty was experienced in proving that sound could be transmitted under water and received at considerable distances, but the receiving apparatus was crude and the essential factor of being able to determine the direction of the signal, was absent. Mr. J. B. Millet, the present Vice-president and General Manager of the Company, with his assistants, perfected the direction finding apparatus, and consequently, made the system a commercial possibility.

Permission having been accorded by the United States government, bells were installed on four lightships between New York and Boston, viz. :—Vineyard sound, Pollock rip, Pollock Rip shoal, and Boston, and the ships of the Metropolitan Steamship Company were equipped with receivers.

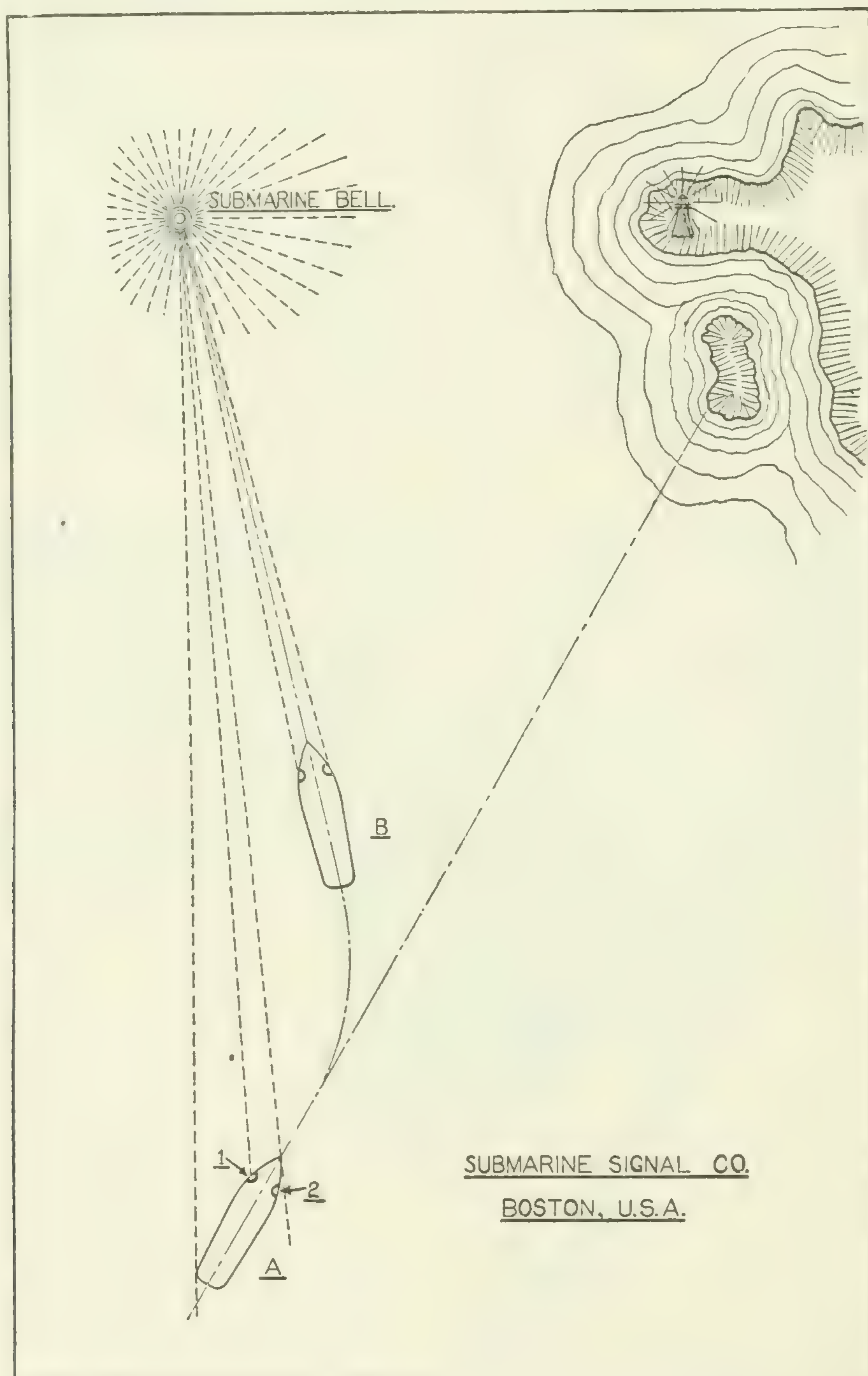
This permitted an examination of the method of submarine signalling to be carried out under service conditions.

Acting under instructions the undersigned proceeded to Boston in September, 1903, and made a preliminary test of the apparatus in Boston bay, on the yacht *Chipeta*. The conclusions arrived at were, viz. :—

1. That the device (of signalling under water) appeared to be eminently practical, and was worthy of being taken up by the department in order to determine its usefulness.
2. That in order to test the system fully it must be taken up concurrently by one or more of the large steamship companies ;
3. The question of cost must be considered.

4-5 EDWARD VII., A. 1905

After the above preliminary report was made, a more thorough investigation was made on board the ss. *James S. Whitney* between New York and Boston. The results obtained by the undersigned proved that:—



Method of determining direction of submarine bell by ship.

1. The bells on the lightships could be heard from five to six miles ;
2. That the direction of the sound could be determined within one quarter of a point ;
3. That the direction and intensity of the sound was not affected by atmospheric conditions.

The ability to find the direction of the warning signal, and the fact that sounds transmitted through the water are not affected by atmospheric condition, distinguish this invention from all existing 'Aids to Navigation'.

SESSIONAL PAPER No. 21

The submarine bell is not destined to replace air fog signals, but to supplement them, although there is no comparison between the reliability of the two signals. It is well known that the sound from a fog alarm may pass over a ship and be audible to a vessel farther away. This phenomenon has been responsible for complaints that fog alarms were not in operation when an investigation proved the contrary.

On behalf of the department, commander O. G. V. Spain, Canadian Marine Service, examined the submarine signal system. In his report commander Spain says :—

‘ I personally heard in the chart room of the *J. S. Whitney*, the Pollock Rip shoal lightship’s submarine bell at a distance of six miles. It was perfectly audible and I had no difficulty whatever in locating the position from the ship at that distance. On arriving within five miles of the Boston lightship, I again heard her bell from the chart room distinctly. I took the wheel of the steamer myself and placed her in every conceivable position. I got the lightship right ahead, right astern and on both bows, beams and quarters, and heard in every position. In my opinion the submarine bell is of very great value as an aid to navigation.’

On behalf of the Shipping Federation of Canada, captain Archibald Reid, port warden for Montreal and surveyor to Lloyd’s Register, London, reported :—

‘ The submarine signal apparatus is easily understood and manipulated by any person who will devote his attention to it. At 8.40 a.m. heard the sound of the bell on the Vineyard Sound lightship, which at first was somewhat faint to my untrained ear, and appeared to be mingled with the whirr and swash of the sea alongside the vessel, but it soon became very distinct, and louder and louder until it was abeam of the vessel at 9.05 a.m., when it gradually became fainter ; the sound was so plain that all the gentlemen in the room that were standing near me heard the sound passing through the receivers which I was holding to my ears. When approaching the lightship, the steamer was manœuvred so as to bring it on both bows, its bearing and location was almost accurately ascertained by the manipulation of the transmitters ; this was done at all the stations where the bells are placed. The time elapsed was 25 minutes from the time I first heard the bell till it was abeam (verified by the men and officers outside as I could not see the vessel.) The speed of the vessel was 15 knots per hour, she therefore must have been from 6 to 6½ miles off when first the sound was heard.

‘ At 4.15 a.m., when trying the instrument the writer heard another bell on the ss. *Herman Winter* : this vessel is fitted with a bell in the forepeak which gives four strokes at intervals sounded by machinery. At 4.22 a.m. she passed abeam, elapsed time 7 minutes, both vessels going about 15 knots, so that she must have been about 2½ miles off when the bell was first heard. I heard the bell on the starboard bow (she was expected to be sighted on the port bow). Shortly after the green light was reported on the starboard bow, she crossed to port, the observer detecting the change.

‘ At 7.43 a.m. we heard the bell on the Pollock Rip shoal right ahead or nearly so, striking 7.3. Seven and then three strokes. At 8.12 a.m. Pollock Rip shoal lightship abeam, time elapsed 29 minutes, or about 7 miles distant when first the sound of the bell was heard.

At 12.40 p.m. the bell on the Boston lightship heard very distinctly on the port bow. I found it was visible about 4 points on the port bow, dead to leeward, with a strong N.E. breeze blowing and not less than 5 miles distant. In this connection I may say a person can at once realize the great advantage the submarine signal has over the ordinary fog signal as the sound being conveyed under water it is immaterial whether you are to windward or to leeward of the sound signal as the sound is transmitted equally well in any direction. It is also a great advantage in determining the hearing or direction of the sound, as the direction of the sound is not diverted by strong winds, snow, heavy rains or other disturbing elements, but the sound wave is transmitted true and clear. Approaching the lightship we experimented on locating its bearing by the varying intensity of the sound when the vessel’s course was altered, and when the vessel was stopped, and going slow, which materially diminished the noises, which interfere more or less with the inexperienced ear catching the bell tones.

4-5 EDWARD VII., A. 1905

‘ Our investigation was satisfactory, and I was agreeably surprised with the success of our experiments and I have no doubt the submarine fog signals will prove a great aid to the careful navigator.

‘ It may also be a factor in preventing collisions at sea when applied as fitted on board the ss. *Herman Winter*. The unsolicited testimony of the master and officers of the steamship *James S. Whitney* was very conclusive, as they sighted several instances where the bell had been of very great service to them.’

The undersigned has also examined a large number of letters received by the Submarine Signal Company from masters of vessels, and in some cases interviewed the writers, and the one opinion is expressed, viz., the great value from a navigational point of view of this new aid.

Mr. C. A. Hutchins, superintendent of lighthouses for Nova Scotia, acting upon instructions from the department, forwarded the following report :—

‘ As directed by telegram, I arranged to meet Mr. Frothingham, of the Submarine Signal Company, at New York, on the 29th September, and inspect the operation of the submarine signal bells at present in use between New York and Boston

On the date named, we together left New York on the ss. *James Whitney* and I listened at the receiver in the pilot house as we approached in succession the lightships off Vineyard sound, Pollock Rip shoals and Boston. At the first lightship, I had not been called in time to catch the sound when first heard by the officers in the pilot house, but when I arrived there, we were about two miles off, and I heard the ship’s number very distinctly. Approaching the Pollock Rip shoals, and later on the Boston lightship, I first caught the sounds at the receiver at a distance of about four or five miles, approximately. I purposely avoided observing the positions of the lightships as we approached, as it was clear weather, and I wished to test the method of ascertaining the direction from which the sound came. The ship was manœuvred by star-boarding and porting the wheel; and by switching the receiver over to port and star-board alternately, the side on which the signal bell on lightship was located was readily ascertained. Continuing, by slowly changing the ship’s course to the opposite side from that on which it was received, I found the sound gradually diminished, was lost, and then picked up on the other bow. In this manner, the direction of the sound, by careful observation could be ascertained within a point.

The experimental bell buoy moored inside of Harding’s ledge, Boston bay, which works automatically by the action of the waves, I heard striking irregularly and less distinctly.

I consider the submarine bells as attached to the lightships named, and operated mechanically on board these vessels, a most valuable invention, and if submerged bells can be operated as efficiently through a cable from a lighthouse or shore, the extent of their usefulness and reliability under all conditions of wind and weather, is immense.’

The detailed report of the undersigned came up for review before the Lighthouse Board and was fully discussed, and ‘ the Board having carefully considered the matter of the installation in Canada of submarine signals, beg to report favourably on the scheme and in that light have the honour to submit the same for consideration.’

The only practical objections which have been urged against the system is the cost to the shipping and the difficulty of maintaining the signals in operation during the season.

The first objection does not seem to be of moment as the ships of the Allan Line, and the Canadian Pacific Atlantic Line in Canada, the steamers of the Metropolitan Steamship Company and the North German Lloyd in the United States, are being equipped with the receiving apparatus.

The question of the difficulty of maintaining the signals in operation is no greater than that now experienced with any aid which must be placed in the water. There are but three cases to consider, viz :—

1. *Bells on lightships*.—Experience has demonstrated the practicability of this method ;

SESSIONAL PAPER No. 21

2. *Bells operated from shore stations.*—This has been successfully done by the Submarine Signal Company at Egg Rock light, Massachusetts bay, where a submarine bell weighing 1,000 lbs. was suspended 60 feet from the surface in water 100 feet deep, and maintained in operation for more than six months, during the winter storms in which time it never failed to operate, and when it was removed it was found to be in as good condition as when it was put down.

3. *Submarine bell buoys.*—These buoys have a bell operated by the motion of the buoy and are subject to no more disadvantages than the various types of buoys now maintained, whether from weather conditions or ice.

Acting on the report of the Lighthouse Board, the department entered into an agreement with the Submarine Signal Company of Boston, U. S. A., for the use of their system of signals in Canada, and the company undertook to install with its receiving apparatus at least thirty steamers making Canadian ports, giving the steamers from three to six months' trial and agreeing to come to satisfactory terms with the owners of the steamships.

The salient points of the contract entered into between the department and the Submarine Signal Company, are as follows, viz. :—

1. The royalty to be \$2,000 per station until the sum of \$100,000 is paid ; in event of more favourable terms being made to any other government a reduction is to be made in favour of Canada ;

2. The Submarine Signal Company agrees to install its apparatus on at least thirty steamers making and entering Canadian ports, giving the said steamers from three to six months' trial free, and to agree with the owners upon an annual rental. Until this is accomplished, the Submarine Signal Company is not to be paid for the submarine bells. In event of failure to agree with the owners, the company have the right to remove the bells.

The department further entered into an agreement with the company for the installation of the receiving apparatus on its steamers at a cost not exceeding one hundred and fifty dollars per ship and an annual rental based on a sliding scale varying from \$500 per annum for a ship of 5,000 tons down to \$25 for a vessel of 50 tons.

Instructions have been given to equip the *Canada*, *Lady Laurier*, *Lansdowne*, *Minto*, *Stanley*, *Druid* and *Montcalm*.

In order to better determine those points on the St. Lawrence route and Atlantic seaboard where submarine bell stations should be established, a special meeting of the Lighthouse Board was held in the offices of the department at Montreal, and the following steamship companies were asked to send representatives with any of their line captains in port at the time, viz. :—

Allan Line Royal Mail Steamships,
Canadian Pacific Atlantic Line,
The Robert Reford Co.,
Messrs. McLean, Kennedy & Co.,
The Dominion Line.

In addition to the above shipping firms, an invitation was extended to the Board of Trade, Montreal, Chambre de Commerce du district de Montréal, Harbour Commissioners of Montreal. A number of captains belonging to the ships then in port attended, and as a result of the conference, the Lighthouse Board recommended that submarine bells be established at the following points, viz.:—

St. Lawrence Route—

- | | |
|----------------------------|------------------|
| 1. Belle Isle, | 7. Fame Point, |
| 2. Green Island, East End. | 8. Matane, |
| 3. South Point, Anticosti, | 9. Point Snell, |
| 4. Port aux Basques, | 10. Cape Race, |
| 5. Point Anguille, | 11. Plate Point, |
| 6. Cape Rosier, | |

Atlantic Coast—

- | | |
|------------------------|-------------------|
| 12. Whitehead, | 18. Brazil Rock, |
| 13. Beaver Island, | 19. Blonde Rock, |
| 14. Egg Island, | 20. Gannet Rock, |
| 15. Sambro, | 21. Beetson Rock, |
| 16. Scatterie, | 22. Negro Head, |
| 17. Little Hope, | |
| and on the lightships, | |
| 23. Anticosti, | 25. Red Island, |
| 24. Lurcher, | 26. White Island, |

and all other lightships which may be established below Quebec.

Progress has been made in carrying out the recommendations of the board and at present, the *Anticosti*, *Lurcher*, *Red Island* and *White Island* lightships have been fitted with submarine bells.

Receiving apparatus has been placed on the *Tunisian* and *Ionian* of the Allan Line, and on the *Mount Temple* and *Lake Manitoba* of the Canadian Pacific Atlantic Line.

Reference has been made above to the equipment of seven of the department's steamers.

The government of Newfoundland has been requested to grant permission to establish the necessary stations at Green Island, Port aux Basques and Point Anguille.

One of the points recommended for the establishment of a submarine signal station was Plate Point, Little Miquelon Island, and the government of France will be asked to accord the necessary authority for the establishment of the station.

The establishment of stations at twelve of the most important points, is contemplated on the opening of navigation. The points selected are the following, viz.:—

- | | |
|--|--------------------------------------|
| 1. Belle Isle. | 7. Plate Point, Little Miquelon Is., |
| 2. Green island (Straits of Belle Isle), | 8. Whitehead, N.S. |
| 3. Point Anguille, (Newfoundland), | 9. Port aux Basques, Newfoundland, |
| 4. Fame Point, P. Q., | 10. Sambro, N. S., |
| 5. Point Snell, P. Q., | 11. Gannet Rock, N. B., |
| 6. Cape Race, Newfoundland, | 12. Blonde Rock, N. S., |

Notice was given of the establishment of submarine bells on the lightships mentioned above, viz.:—

Lurcher lightship, Notice to Mariners, No. 72, of 1904, 14th of September, 1904:
Anticosti lightship, Notice to Mariners, No. 68, of 1904, 26th of August, 1904.

The equipment of the Red and White Island lightships was completed, but notice will not be given until these lightships resume their station next spring.

The notices quoted above stated that vessels equipped with receiving apparatus should be able to hear the bell at a distance of five miles and determine its bearing within one quarter of a point. Vessels not so equipped should receive a warning signal when from one to two miles distant depending on the construction of the ship. This should be audible to an observer below the water line and with the ear close to the hull of the vessel.

Instructions were given at the same time to ring the bell on the approach of any vessel within five miles, and the masters of vessels were requested to report as to the distance the bell was heard.

Before the *Anticosti* left for her station, an official test was carried out on behalf of the department by Mr. W. H. Noble, assistant commissioner of lights.

In his report Mr. Noble states:—

'The *Anticosti* left Quebec at 2.30 p.m. and came to anchor at 8.30 p.m. one-third mile north of the Crane island gas buoy. The tug *E. M. Hackett* which accompanied the *Anticosti* also anchored near the gas buoy. The following morning, the tests were made on board the tug, the lightship remaining in her anchored position one-third mile north of the buoy.

SESSIONAL PAPER No. 21

‘The following points at which the bell was heard were afterwards verified on the chart :—

‘The lightship one-third mile distant from gas buoy bearing S. by E. 7.20 a.m., Wood pillars N.E. by N., L’Islet wharf S.E. by S. distinctly heard three miles. Ran two miles N.E. by E. one half east, not heard. Returning towards lightship 8.45 a.m. in line across from L’Islet church to east of Goose Island, heard distinctly 3½ miles. 8.55 a.m. east end of Goose island, N.N.W. ¼ west, and L’Islet wharf S. by E. heard faintly 4½ miles, which from other trials was found to be the limit. Several other trials were made between these points on the line of the deepest water, and all were heard quite distinctly up to the 4½ mile limit.

‘The tug could not run down the river any further on account of the salt water fouling her boiler, otherwise the trials would have been made in deeper water and under more favourable circumstances. The tug was not equipped with the standard receiving apparatus, only the portable ball apparatus suspended over the side was used.

‘It was clearly shown even with this temporary apparatus, how the direction of the bell could be ascertained, the sound on one side being so much more distinct than on the other.

‘The number “fifteen” of the lightship was clearly struck, viz. :—one stroke, four seconds interval, followed by five strokes at intervals of one second, followed by ten seconds interval.

‘The device for striking these numbers is simple and ingenious, and can be applied for any number, which would at once enable the mariner to identify the station.

‘From my observation of these tests, I have no hesitation in saying that the use of the submarine bell is bound to become a most valuable aid to navigation far exceeding the services of any present fog alarms, inasmuch as under ordinary conditions of operation, the mariner may rely on the submarine bell signal at least four miles distant, probably at a much greater distance with larger bells and improved receivers, which with the best fog signals cannot be relied upon over two miles. At important headlands with outlying deep water the bell appears to be most valuable as it would undoubtedly be heard at greater distance than in shallow water. Altogether, the bell to-day in its present stage, is a complete success.’

Detailed plans have been prepared for the shore stations required, and the work of establishment will be carried out on or before the opening of navigation next season.

The undersigned considers that a system of submarine signals is a valuable aid to navigation. Properly maintained, and properly used by the navigator, it should very largely conduce to the safety of the route.

LIST of the various aids to navigation throughout the Dominion, November 30, 1904

	Light Stations.	Lights.	Keepers.	Fog Whistles and Sirens.	Fog Horns.	Fog Bells.	Fog Guns or Bombs.	Whistling Buoys.	Bell Buoys.	Gas Buoys.
Province of Ontario.....	220	296	199	5	11	4			3	
Lightships.....	3									
Province of Quebec.....	160	225	191	9	8	1	8	1	1	
Lightships.....	7									
Province of Nova Scotia.....	212	223	205	12	6	2	1	33	26	
Fog alarms.....	3									
Lightships.....	1									
Province of New Brunswick.....	107	139	108	6	8	2	1	10	11	
Fog alarms.....	4									
Lightships.....	2									
Province of Prince Edward Island..	40	69	46		1			3	1	
Province of British Columbia....	37	44	34	1	6	6				
	796	996	783	33	40	15	10	47	42	106

4-5 EDWARD VII., A. 1905

It has been customary in the annual report in past years' to include many details of changes throughout the different agencies, and while omitted in this report, it will likely be continued in the future.

The undersigned desires to thank the members of his staff for their efforts during the past year.

J. F. FRASER,
Commissioner of Lights.

DEPARTMENT OF MARINE AND FISHERIES.
OTTAWA, December, 1904.

APPENDIX No. 3.

LIGHTHOUSE BOARD REPORT.

To the Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit, herewith, the first annual report of the Lighthouse Board of Canada.

The duties of the Lighthouse Board as laid down by Order in Council of February 26, 1904, are to inquire into and report to the Honourable the Minister of Marine and Fisheries from time to time, upon all questions relating to the selection of lighthouse sites, the construction and maintenance of lighthouses, fog alarms, and all other matters assigned to the Minister by section 2 of Chapter 70 of the Revised Statutes of Canada, being an ‘Act respecting Lighthouses, Buoys and Beacons, and Sable Island,’ and which reads :—

‘The Minister of Marine and Fisheries may direct the construction of all lighthouses, light ships, floating and other lights, lanterns and other signals, buoys, beacons, anchors and landmarks, and of all buildings and other works belonging thereto and in connection therewith, hereafter to be constructed at the expense of Canada for the greater security and facility of navigation, the construction of any of which is, by the Governor in Council, placed under the direction of the said Minister, as well as the maintenance and repair of all similar buildings and other works placed under his direct control and management by this Act, but nothing in this Act shall give authority to the said Minister to cause expenditure not previously sanctioned by Parliament.’

Since the Lighthouse Board was constituted, ten meetings have been held, and the recommendations for improvements in existing aids to navigation, and the establishment of new aids, agreed upon, submitted to the Honourable the Minister and approved by him, aggregate the estimated sum of \$353,188., divided amongst the different provinces as follows :—

Quebec (St. Lawrence route).....	\$184,073
Lights on Newfoundland coast maintained by the govern- ment of Canada.....	56,000
New Brunswick.....	45,500
Nova Scotia.....	32,515
British Columbia.....	15,300
Ontario.....	12,200
Prince Edward Island.....	7,000
Total.....	<u>\$353,188</u>

It will be noticed that of the total amount recommended by the Board to date, for expenditure on lights, &c., nearly two-thirds is intended for the St. Lawrence route, in connection with which the department is committed to extensive improvements.

Included in this sum of \$353,188 is a considerable proportion for new dioptric apparatus for the important sea-coast lights.

During the season of navigation there was brought to the attention of the department a new aid to navigation in the form of a submarine bell, which upon being reported favourably to the board, and recommended by the board for adoption in Canada, a conference was held at Montreal with the shipping interests in order to ascer-

4-5 EDWARD VII., A. 1905

tain the views of the principal lines in regard to the location of these bells along the St. Lawrence route and Atlantic sea-board. The meeting was a very representative one of the shipping interests trading to Montreal, and there also being present a number of the shipmasters engaged on the St. Lawrence route. After the matter was thoroughly discussed, it was unanimously agreed that the points where submarine bells should be located to give best results as aids to navigation are as under, given in the order of their importance.

St. Lawrence Route.

- | | |
|----------------------------|------------------|
| 1. Belle Isle. | 7. Fame Point. |
| 2. East End, Green Island. | 8. Matane. |
| 3. South Point, Anticosti. | 9. Point Snell. |
| 4. Port au Basque. | 10. Cape Race. |
| 5. Port Anguille. | 11. Plate Point. |
| 6. Cape Rosier. | |

Atlantic Coast.

- | | |
|--------------------|-------------------|
| 12. Whitehead. | 18. Brazil Rock. |
| 13. Beaver Island. | 19. Blonde Rock. |
| 14. Egg Island. | 20. Gannet Rock. |
| 15. Sambro. | 21. Beatson Rock. |
| 16. Scattarie. | 22. Negro Head. |
| 17. Little Hope. | |
- and all lightships (4).

The Lighthouse Board is composed of the following officials .

Lieut. Colonel F. Gourdeau, Deputy Minister of Marine and Fisheries, chairman.

Lieut. Colonel W. P. Anderson, Chief Engineer, Department of Marine and Fisheries.

Commander O. G. V. Spain, R.N., Commanding Canadian Marine Service.

Mr. J. F. Fraser, Commissioner of Lights ; and

Mr. Hugh A. Allan, of Montreal, as representing the shipping interest generally.

When any matters pertaining to aids to navigation within the Montreal or Quebec pilotage districts are under consideration by the Board, the president for the time being of the Corporation of Pilots for these respective districts, shall respectively be *ex officio* a member of the board when summoned by the chairman to attend such meetings.

I have the honour to be, sir,
Your obedient servant,

W. C. GORDON.
Secretary.

OTTAWA, December 7, 1904.

SESSIONAL PAPER No. 21

APPENDIX No. 4.

REPORT OF THE OFFICER IN CHARGE OF HYDROGRAPHIC SURVEYS.

HYDROGRAPHIC SURVEY,

The Deputy Minister
Marine and Fisheries,
Ottawa.

OTTAWA, November 25, 1904.

SIR,—I have the honour to present the following synopsis of the work performed by the survey under my charge during the past season :—

Upon the opening of navigation Mr. F. Anderson was assigned to the completion of the survey of Lake Winnipeg. For this he again chartered the tug *Frank Burton*, and with two assistants, Messrs. Chatigny and Cinq-Mars, made such progress that for all ordinary purposes of navigation the lake can be charted and the new charts should prove a great benefit.

Early in May I personally took charge of the party surveying on Lake Superior with the steamer *Bayfield* and, with a staff composed of Messrs. R. E. Tyrwhitt, Robt. Rolland, and A. O. Bourbonnais, completed the resurvey of Thunder and Pigeon bays. Outside of Thunder cape, the triangulation of the shore was continued as far east as Lamb island and all the traversing of the shore, with the exception of Black bay, completed. In addition to this, the sounding off shore was finished as far east as Point Porphyry.

In the Spring an examination of Outer Pancake shoal was made and in the Autumn a large area of unsurveyed water, in the same vicinity, was sounded over.

Advantage was taken of the triangulation of Lake Superior made by the U. S. Corps of Engineers, for a base line :—Thunder cape to Isle Royale East, both of which points have been found.

Observations to ascertain the variation of the magnetic needle were made at Pigeon bay, Isle Royale, near Magnet point and near She-She bay. A great number of readings of the needle on the theodolite were taken with a view of learning something of the reported disturbance in the vicinity of Magnet point. As far as my observations went the disturbance amounted to about one point, but the examination is not yet complete.

During the season the department assumed control of all hydrographic surveys being conducted in Canada, and I was placed in charge of the new Hydrographic Survey Branch. As a consequence the Hydrographic Survey of the River St. Lawrence was transferred from the Department of Public Works and a similar survey of Lake St. Louis was transferred from the Department of Railways and Canals.

The survey of the River St. Lawrence is in charge of Mr. P. E. Parent who has for assistants Messrs Amos, Decary, McGreevy and Houlston, using the steamer *de Levis*. During May and June sounding was carried on at Richelieu rapids, thus completing the sounding between Longue pointe and Pointe Platon.

To connect the survey between Pointe Platon and Montreal with Quebec a triangulation was undertaken but not quite completed. The shore topography on both sides of the river has been completed as far northeast as Quebec.

To complete the survey of the river there yet remains triangulation to connect with the observatories at Montreal and Quebec in addition to a revision of some triangles in Lake St. Peter, as well as the cutting in of new lighthouses and prominent buildings.

This I estimate will take a season.

After taking over the survey, I had Mr. Amos detailed for a couple weeks to the Lake Superior Survey for instruction in the use of a magnetometer. Since his return

4-5 EDWARD VII., A. 1905

to the river he has been engaged in a series of observations for the variation of the magnetic needle between Montreal and Sorel. The results are attached.

The survey party transferred from the Department of Railways and Canals is under the command of Mr. Ernest Fusey, and engaged in a survey of Lake St. Louis. This work was continued during the season and a large area closely examined at the head of the Lachine rapids.

To make a complete survey of the great St. Lawrence waterway I thought it advisable to commence operations upon the sole remaining unsurveyed link viz.:—Lake St. Francis. A small party under Mr. Bickerdike has made some progress there and I hope that another season will complete it.

In June last, the British Admiralty issued a circular requesting the more important self governing colonies to conduct hydrographic surveys along their own coasts. Canada, it was stated, had one party upon the Great Lakes and left the Atlantic and Pacific coasts for the Admiralty surveys for which they contributed half the cost. To properly answer this circular it will be necessary to equip one party on each coast, and such work is rendered doubly important by the fact, that ere long the Grand Trunk Pacific will require a terminus at some, as yet unsurveyed, portion of our Pacific coast. In the Gulf of St. Lawrence a great deal of coast has not been surveyed and more has had only a very superficial examination made. To carry out these surveys a couple of steamers, similar to the *Bayfield* will be necessary.

As each party finished its season the staff moved to Ottawa where the headquarters will be for the future.

I have the honour to be, sir,
Your obedient servant,

WM. J. STEWART,
Hydrographer.

MAGNETIC OBSERVATIONS FROM LAKE SUPERIOR.

Places.	Latitude.	Longitude.	Variation.
Pigeon Bay.....	48—02—00 N	89—28—50 W	3—54.5 E
Mott's Island.....	48—06—20 "	88—32—30 "	1—56.7 "
Flox Island	48—27—20 "	88—30—05 "	1—05.3 "
Observation Island.....	48—33—20 "	88—17—45 "	3—10.8 "

WM. J. STEWART.

MAGNETIC OBSERVATIONS FROM BOUCHERVILLE TO LAKE ST. PETER.

Places.	Latitude.	Longitude.	Variation.
Boucherville.....	45—37—00 N	73—27—50 W	11—48.2 W
Varembes.....	45—41—25 "	73—26—35 "	13—27.4 "
Vercheres.....	45—46—15 "	73—22—20 "	13—51.6 "
Contrecoeur.....	45—51—40 "	73—14—30 "	15—00.8 "
Lanoraie	45—57—40 "	73—12—55 "	15—08.8 "
Sorel.....	46—02—55 "	73—05—45 "	15—19.7 "
Chenal du Moine	46—05—20 "	72—57—37 "	15—01.4 "

WM J. STEWART.

APPENDIX No. 5

METEOROLOGICAL REPORT.

METEOROLOGICAL OFFICE,

TORONTO, October, 1904.

Lt.-Col. F. GOURDEAU,
Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit the thirty-third annual report of the Meteorological Service of Canada, this report being for the fiscal year, July 1, 1903 to June 30, 1904, with Appendices A and B, reports of St. John and Quebec observatories.

The number of persons in receipt of pay from the Meteorological Service on June 30 for various duties performed in connection therewith was 167. Of this number twenty are employed in the central office, and with a few at outside stations devote their whole time to the work of the service ; others are occupied in observing during only a portion of each day, and others again are employed only to attend to the display of storm signals when notified.

There are now in the Dominion, Newfoundland and Bermuda 340 Meteorological stations using instruments which have been supplied by the government. The observers at 237 of these stations take the observations voluntarily, sending regular monthly returns to the Central Office, and to these persons are due the hearty thanks of the Service. At 64 stations, lying chiefly in the far northern territories of Canada, in the wheat belt of the North-west Territories and at lighthouses in the Gulf of St. Lawrence, small gratuities are allowed observers. At 39 stations distributed at nearly equal intervals throughout the Dominion, three or more observations are taken daily, and as the observers are paid salaries, promptness and careful attention to duty are insisted upon. From 34 of these stations two reports each day are telegraphed to Toronto to be used in the preparation of the daily weather chart.

Since the issue of my last report the following stations have been opened.

BRITISH COLUMBIA.

- Class II.—Nickel Plate, F. G. White.
- “ II.—Big Creek, H. E. Church.
- “ II.—Cowichan, T. U. English.
- “ II.—Thetis Island, A. P. W. Nixon.
- “ II.—Hedley, A. H. Brown.
- “ III.—Alberni, Henry Hills.

Kuper Island.—Rev. Mr. Roberts has resumed thermometric observations from May last.

NORTH-WEST TERRITORIES.

- Class II.—Hillsdown, R. E. Fiske.
- “ II.—Rosthern, Rev. N. Casimir O.S.B.
- “ II.—Lloydminster, Stanley Rackham.
- “ II.—Yorkton, A. W. Hyde.
- “ II.—Stoughton, H. U. Simmers.
- “ II.—Broadview, W. G. Brammell.
- “ III.—Last Mountain, L. Stewart Irwin.
- “ III.—Arlington Beach, A. A. Downey.

MANITOBA.

Class	II.—Cartwright, J. Mason.
"	II.—Pipestone, J. R. Anderson.
"	II.—West Selkirk, George Robinson.
"	II.—Birtle, James I. Foster.
"	II.—Virden, N. S. Simpson.
"	II.—Carman, R. Kellett.
"	II.—Portage La Prairie, W. H. Miles.
"	II.—Pierson, A. W. Riddell.
"	II.—Swan River, J. D. Bigham.
"	II.—Cypress River, W. B. Gillam.
"	III.—Rosebank, James S. Gibson.

In Ontario the following stations having for various reasons ceased to report, have been removed from the list of stations—North Bay, Sudbury, Schreiber, Cartier, Dunnville and St. Marys.

In Quebec, St. Agathe des Monts was closed owing to the removal of the Observer.

CENTRAL OFFICE.

The staff as regards numbers remains as at the date of my last report. In April, however, Mr. Kingsford resigned and the vacancy thus created was filled by the appointment of Mr. Jackson. My assistants have during the year just closed, faithfully attended to their several duties, and I have every reason to be gratified at the uniform zeal and untiring energy with which the work of the central office is performed.

I would again respectfully urge that larger salaries be allowed to every one in the central office. The salaries paid in this office have always been very small, and as the cost of living has increased so materially during the past two or three years, many of the men are on lower pay than very junior clerk in stores.

Another matter of importance to which I would also respectfully call your attention is the total inadequacy of the present office for the performance of the Meteorological work. The various rooms are altogether too small for the work carried on in them, and perhaps indeed too small to be healthful.

Our library is full to overflowing with Meteorological exchanges and reports from all parts of the world, and it is with difficulty we now find storage room for our most valuable records.

The land surrounding the office building having been so much curtailed by concessions to the University of Toronto, there is now not sufficient space for the proper exposure of Meteorological instruments. A temporary expedient to insure suitable exposure has been adopted by placing some of our instruments on a lot of land $\frac{1}{2}$ mile distant, but this is not satisfactory as it entails having an observer especially assigned for this duty, and besides this the instruments are unprotected from injury by vagabonds.

The climatological report for the year 1902 has been issued, containing the mean monthly and annual values for each of nearly 350 stations at which Meteorological observations are taken with instruments provided by the government. When it be remembered that all additions are made, and all means are computed at the central office, the labour entailed in the preparation of such reports, will be understood; the manuscript of the 1903 report is now with the King's Printer.

Each month a weather review has been issued, giving a general summary of the weather of the month, a brief synopsis of the changes in atmospheric pressure and also general information as to temperature, precipitation, prevailing winds and miscellaneous phenomena, together with tables giving mean values.

Also on the 3rd of each month is published a weather chart, showing graphically for the month just closed, departures from average mean temperature, also the rainfall of the month, together with mean values and notes as to the general character of the month's weather and a statement as to the growth of vegetation and crops. This chart

SESSIONAL PAPER No. 21

has been found most valuable, having without doubt had a marked effect in retaining the interest of voluntary observers.

The daily forecasts, as for some years past, have been issued both morning and evening. The latter edition which is sent out about 10.30 p. m. is now published in nearly every morning journal in the Dominion, besides as heretofore being posted up at all telegraph offices ; the first message which usually goes over the wires each day being the forecast. The morning forecast covering the current and following day is issued to all parts of the Dominion and continues to grow in favour. It is printed in nearly all afternoon newspapers ; at shipping posts is posted up in conspicuous places, where it may be seen by mariners and at many of the larger centres of population is duplicated and distributed to business houses and shippers of perishable goods.

Up to the beginning of the past financial year, no forecasts were issued for the North-west Territories, but since July, 1903, a bulletin has each day been despatched to Winnipeg and thence distributed to the larger agricultural centres, and I am informed that it is giving great satisfaction in all districts. For the compilation of this bulletin, in addition to reports from the regular reporting stations, special reports are received from some 34 points in Manitoba and the Territories, and these all together are published in a table which gives the temperature and weather at 6 a. m. ; the highest temperature of the previous day ; the lowest temperature during the night and the rainfall if any, of the past twenty-four hours. Following the table is a statement of the weather conditions of the past day and a general forecast of the probable weather of the following two days. This bulletin has naturally increased the already onerous duties of the forecast officials to a marked extent, besides adding materially to the anxiety which must necessarily be felt by persons whose fallible judgments have constantly to stand the criticism of a public, not always ready to make adequate allowance for failure.

The shippers of perishable goods continue to make frequent use of special forecasts given by telegraph and by telephone, and during the winter season I question whether there is a single shipper in Toronto who does not consult the central office before hazarding a consignment by rail.

Another work undertaken by this office is the despatch of special warnings of snow storms and drift to the various railways of the Dominion. The railway officials most certainly appreciate our endeavours to render service and I doubt not are saved time and money by being forewarned.

The forecast work is performed by the Director and Mr. B. C. Webber, together with two assistants, who as yet are but rarely allowed to issue the bulletins.

Two telegraph operators are permanently employed, receiving the weather reports on which the forecasts are based, and in sending out the bulletins and storm warnings.

The percentage of verification of forecasts is shown by the following table.

TABLE I.—NUMBER of Predictions and Percentage of Fulfilment in each District, in each Month, and in the Year, July 1903, to June 1904, inclusive.

MARINE AND FISHERIES										4-5 EDWARD																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
MANITOBA.				LAKE SUPERIOR.				LOWER LAKE REGION.				GEORGIAN BAY.				OTTAWA VALLEY.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
MONTH.	Verified.			Number of Predictions.	Verified.			Number of Predictions.	Verified.			Number of Predictions.	Verified.			Number of Predictions.	Verified.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
	Number fully.	Number partly.	Number not.		Percentage.	Number fully.	Number partly.		Number not.	Percentage.	Number fully.		Number partly.	Number not.	Percentage.		Number fully.	Number partly.	Number not.	Percentage.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
1903.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													</

TABLE II.—NUMBER OF PREDICTIONS AND PERCENTAGE OF FULFILLMENT IN EACH DISTRICT, IN EACH MONTH, AND IN THE YEAR, JULY, 1903, TO JUNE, 1904, INCLUSIVE.

Month.	UPPER ST. LAWRENCE VALLEY.				LOWER ST. LAWRENCE VALLEY.				GULF.				MARITIME WEST.				MARITIME EAST.				TOTALS.							
	Verified.				Verified.				Verified.				Verified.				Verified.				Verified.							
	Number of Predictions.				Number of Predictions.				Number of Predictions.				Number of Predictions.				Number of Predictions.				Number of Predictions.							
	Number fully.	Number partly.	Number not.	Percentage.	Number fully.	Number partly.	Number not.	Percentage.	Number fully.	Number partly.	Number not.	Percentage.	Number fully.	Number partly.	Number not.	Percentage.	Number fully.	Number partly.	Number not.	Percentage.	Number fully.	Number partly.	Number not.	Percentage.				
1903.	119	104	6	989.1	124	105	11	889.1	125	101	12	1285.6	120	99	14	788.3	120	97	11	1285.4	1200	1009	111	8088.7				
	113	93	13	788.0	118	102	8	889.8	112	94	12	689.3	114	101	12	193.8	112	96	15	194.2	1165	985	130	5090.1				
	119	87	22	1082.4	107	88	15	489.3	109	88	17	488.5	112	87	13	1283.5	112	85	13	1181.7	1117	861	166	9084.5				
	119	97	19	389.5	118	90	19	984.3	119	94	17	886.1	118	88	21	983.4	118	88	23	784.3	1174	931	185	5887.2				
	106	82	19	586.3	114	93	12	986.8	113	92	13	887.2	117	87	20	1082.9	116	88	20	884.5	1115	890	152	7386.6				
	100	73	19	882.5	116	98	14	490.5	116	103	8	592.2	126	94	18	1481.7	126	95	19	1282.9	1106	845	183	7884.7				
1904.	103	84	17	289.0	100	85	12	391.0	99	82	13	489.4	126	91	21	1480.5	126	100	15	1185.8	1074	866	153	5587.7				
	101	80	15	686.6	114	86	17	1182.9	113	87	16	1084.1	116	82	28	682.7	116	82	27	782.3	1056	800	181	7584.3				
	104	83	15	687.0	103	87	11	589.8	105	84	14	786.6	122	97	19	687.3	122	97	18	786.9	1046	817	169	6086.2				
	97	76	17	487.1	104	81	15	885.1	101	75	15	1181.7	111	81	24	683.8	111	76	27	880.6	1042	807	172	6385.7				
	97	76	14	785.6	93	72	15	685.5	97	71	17	981.9	107	90	16	191.6	107	84	14	985.0	988	767	156	6585.5				
	100	82	13	588.5	99	73	19	783.3	100	80	17	388.5	101	75	23	385.6	102	77	19	684.8	1019	806	164	4987.1				
Totals.				1278	1017	189	72	87.0	1310	1060	168	82	86.8	1390	1072	229	89	85.4	1388	1065	221	102	84.7	13102	10384	1922	796	86.6

NOTE.—In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

4-5 EDWARD VII., A. 1905

Storm Warnings.—The issue of storm warnings is considered perhaps the most important work of the central office, and as in the issue of daily forecasts, it requires most careful judgment and faithful attention to duty, never failing to inspect the weather maps twice each day, not excepting Saturday evenings and Sunday mornings at which times the ordinary forecast are not issued. During the stormy seasons the ceaseless strain on the forecast men is very trying, and in my opinion their remuneration should be greatly in excess of that now given.

The storm warning display stations are 75 in number and about to be increased to 77 by the addition of St. Adelaide de Papos and L'Anse à Beaufile. During the year, 1,305 warnings were issued to our storm signal agents, and of this number 1,105 or 84·7 per cent were verified, 147 were received late, of which 105 were owing to issue and 42 to delay in telegraphic transmission, 76 storms did not reach the velocity indicated by the signal displayed and 7 exceeded it.

In connection with the warnings, the directions from which the wind was expected to blow during the storms were also given to agents and, of the 1,105 warnings verified as to force, 896 or 81·1 per cent were fully verified and 1,062 or 96·1 per cent fully and partly verified.

Photography.—The magnetic instruments at Agincourt and a barograph, a thermograph and seismograph at Toronto all register photographically, and the records obtained from these instruments are developed at the central office and all trace measurements are here made. This work occupies the whole time of one man, who indeed has frequently to receive other assistance in order that his work may not fall behind.

Station Equipment.—Thermometer shelters and fittings, also supports and attachments for wind gauges, &c., are manufactured in this office. Storm signals are manufactured in Toronto and shipped from this office, and all instruments are here packed and distributed to the various parts of the Dominion.

Time Service.—During the year ending June 30, 1904, 64 stellar observations for time were made in the meridian with the transit instrument, also 6 solar observations were taken. The position of the stars used were those given in the *Berliner Jahrbuch*. The collimation error of the transit instrument has varied very little during the year and has frequently been determined from micrometrical measurements on the collimating telescope and by reversal on stars. The azimuth and level errors have also remained very steady, their variation being exceedingly small. The mounting of the transit instrument still remains in a very satisfactory condition, its stability being such that no re-adjustment of the instrument to the meridian has been found necessary since its installation some twenty years ago.

With the equatorial telescope the sun spot observations have been continued, maps of the sun's surface four inches in diameter being obtained on 99 days from September 23, 1903, to June 30, 1904. The only days on which the sun was observed to be free of spot were February 1 and 16. On October 2, 1903, a moderately large penumbral spot appeared over the eastern limb followed on the 4th, by another disturbed area farther south, this latter developed into the largest group of sunspots occurring this year. It passed south and about midway between the sun's centre and the south limb on October 10. These two groups apparently maintained their relative sizes until they disappeared over the western limb. A return of these two groups took place, the northern group being central on November 5 and the southern group November 9. Both groups were considerably altered in appearance, the northern being broken up into two distinct spots and the southern one also into two separate groups with a well defined spot in each. Their appearance rapidly changed during their passage to the west limb the spots disintegrating and closing up.

A large and beautiful spot appeared on the 4th February, 1904, becoming central and north on the 11th. Numerous small scattered spots and groups continually appeared and passed away during most of the year.

The time exchanges with Montreal, Quebec and St. John have been carried on as usual and registered on the chronograph at Toronto. The errors of the Toronto clock and of the time pieces used by the different observers elsewhere are computed from the

SESSIONAL PAPER No. 21

latest observations. Both the sidereal and mean time clocks of the Toronto Observatory with their various electrical appliances have continued to work well and give great satisfaction.

The difficulties in connection with the running of the large electrical seconds clock in the hall of the observatory have been overcome, and freedom from dropping seconds has been secured by a device to prevent sparking at the point of contact in the mean time clock which controls the electric clock. It now does its work well and with certainty.

The following table shows the difference between the time by 'Standard Observer' and that given at the various exchanges. The sign + indicates that the time sent from the different observatories is faster than that by 'Standard Observer'. The time by 'Standard Observer' is the arithmetical mean of the times determined at Toronto and Montreal.

		Toronto.	Montreal.	Quebec.	St John.
1903.		Secs.	Secs.	Secs.	Secs.
July	31.....	+0.52	—0.52	+1.32	+1.63
Aug.	14.....	0.00	.....	—0.46	.....
Sept.	11.....	—0.06	+0.06	—0.38	+0.09
"	25.....	+0.51	—0.51	—0.29	+0.24
Oct.	16.....	—0.24	+0.24	+0.54	.....
"	30.....	—0.26	+0.26	—1.22	+0.57
Nov.	13.....	+0.22	—0.22	—0.81	—0.51
"	27.....	0.01	+0.01	+1.92	—0.28
Dec.	11.....	0.00	0.00	+0.54	—0.08
1904.					
Jan.	15.....	+0.09	—0.09	—0.27	+1.26
Feb.	12.....	—0.28	+0.28	—0.99	—1.51
"	26.....	+0.23	—0.23	—0.27	+1.17
Mar.	11.....	+0.37	—0.37	+0.81	.....
"	30.....	—0.09	+0.09	—0.06	+0.39
April	15.....	—0.22	+0.22	+0.25	—0.63
May	6.....	—0.22	+0.22	—0.16	+0.04
"	27.....	+0.04	—0.04	+0.75	—1.21
June	10.....	—0.31	+0.31	—0.40	—0.80
"	24.....	—0.10	+0.10	+0.72	—0.13

SEISMOLOGICAL OBSERVATIONS.

The Milne Seismographs at Toronto and Victoria, B.C., have been kept in successful operation throughout the year, and copies of important disturbances together with tabular results of all earth tremors have been forwarded to Professor Milne, Secretary of the Seismological Committee of the British Association at London ; also to Dr. Reid, Department of the Interior, U.S. Geological Survey, Baltimore, and occasionally to scientific societies in other countries. Our observations have been highly valued by these bodies, and are used in conjunction with those from some 37 other stations located in different parts of the world for the purpose of furthering seismological research.

During the year 57 disturbances were recorded at Toronto and 59 at Victoria. The most important occurred on January 20 and June 25. The swing of the booms at each station being about 12 millimetres.

The great Macedonian earthquake of April 4, in which 25 persons lost their lives and 1,500 houses were destroyed, was registered at both stations as a medium disturbance. The preliminary tremors reaching Victoria at 10 h. 25.5 m. G.M.T. and Toronto two and one-half minutes later.

INSPECTION OF METEOROLOGICAL STATIONS.

In order to adjust the various meteorological instruments where necessary and inspect the storm signal apparatus in use, a number of stations in the maritime provinces were visited by the director during July and August, 1903. At Caraquet, a proposed new site for the signal mast was examined and was found to be too far from the telegraph office. At Pictou, the steel signal tower which takes the place of a mast, being more durable, was working quite satisfactorily and the agent appeared to be most efficient. The same may be said of St. Andrews, where the signal mast showed signs of great care. Repairs were ordered at Grand Manan, Bathurst and several other stations.

During the year comprised in this report, 28 stations were visited by Mr. B. C. Webber. Continuing the inspection in Manitoba, the Territories and British Columbia, commenced in June, 1903, instruments were examined and adjusted where necessary at Vancouver and Victoria early in July. In September, Parry Sound, Ont., Depot Harbour, Ont. and Bissett, Ont., were visited. At the former station a change of observers having taken place, the new observer was instructed in his duties and the instruments were moved to his residence and adjusted. In February, 1904, upon the death of the observer at Halifax, this station was visited and the new observer was instructed and the instruments were moved and adjusted. In order to extend the weather bulletin service in Manitoba and the North-west Territories new reporting stations were required and accordingly these stations were established in June, 1904, and the various observers were instructed. Other stations were visited en route and changes in exposure of instruments, were made where necessary.

In August, 1903, Father Point, P.Q., Chicoutimi, P.Q., and Sherbrooke were inspected by Mr. H. V. Payne. At these stations the instruments were adjusted and where required change of exposure was ordered.

Other stations were inspected as follows:—Chatham, Ont., Pelee Island, Ont., Amherstburg, Ont., Sarnia, Ont., White River, Bissett and Rockliffe, by Mr. Wm. Allan, of the Central Office; Liverpool, N.S., and Bridgeport, N.S., by Mr. D. L. Hutchinson, of St. John, N.B.; Wiarton, Ont., and Southampton, Ont., by Wm. R. Kingsford of the Central Office; Naas Harbour, B.C., Port Simpson, B.C., Katamaat, B.C., and Rivers Inlet, B.C., by Mr. Baynes Reed, Victoria; Vancouver, Banff Mountain Observatory and Edmonton by Mr. F. N. Denison, Victoria, B.C.

METEOROLOGICAL STATIONS.

There are now 34 meteorological stations reporting twice daily to the central office, the data thus provided being used in the preparation of the charts for forecasting purposes. During the year three telegraph station observers have died, Messrs. Allison, of Halifax, Whitehead, of White River, and McIntyre, of Rockliffe. The two former were ideal observers; the latter an elderly man who in years gone by, did good work for the service, of late years, has deputed the work to a son.

I cannot emphasize too strongly the desirability of having thoroughly intelligent and educated observers at these chief meteorological stations; it is not a matter of mere parochial importance, as on their reports in a measure depends the accuracy of our Canadian forecasts and warnings, and beyond this we owe it to the scientific world in general and to the United States in particular, that the work performed at these stations shall be of a high order and thoroughly reliable. Three times each month we send the mean values of the instrumental records obtained at these stations during the decade, to Hamburg, Germany, to be used in the preparation of an International Meteorological Chart. A special study is at present being made in the central office of the formation of cold waves in our far north, and this inquiry I find by letters received, is interesting not only to ourselves, who are perhaps most directly affected, but also meteorologists in the United States and Europe.

During the past year reports from all meteorological stations west of Lake Superior together with various U.S. reports from stations west of the Mississippi have been wired twice daily to Victoria, B.C., where regular weather charts have been prepared

SESSIONAL PAPER No. 21

and forecasts issued by Messrs, E. Baynes Reed and F. N. Denison. Notwithstanding the difficulties to be contended with in forecasting on the Pacific coast, the percentage of verification obtained is most creditable.

In addition to the weather forecasting in British Columbia, Mr. E. Baynes Reed has undertaken to study the floods on the Fraser river with the hope of ultimately being able to give due warning of dangerously high water. Several observers have been obtained on the Fraser and the Thomson rivers, who read river gauges daily during certain seasons and report to Victoria.

At Banff an observatory has been completed on the summit of Sulphur mountain with the following equipment. A barograph and thermograph, which will record pressure and temperature for a fortnight without the clocks being wound. A barograph and thermograph which record automatically in the lower station at Banff village, the upper and lower stations being connected by a cable; also a wind gauge which records at the lower station. It is believed that results obtained at this observatory will be very instructive.

In closing this report it is incumbent on me to make mention of the very harmonious and agreeable relations existing between the United States Weather Bureau and the Canadian Service. All communications addressed to Washington are acknowledged and treated with the utmost courtesy. The exchange of reports between the two countries continues as heretofore and although Canada does not possess anything approaching the number of stations that the United States do, yet the chief of the American Bureau is willing to give us reports from each and every one of the stations under his control.

All of which is respectfully submitted,

R. F. STUPART,
Director.

APPENDIX 'A'

METEOROLOGICAL SERVICE, ST. JOHN OBSERVATORY,

ST. JOHN, N. B., October 31, 1904.

R. F. STUPART, F.R.S.C.,
Director, Meteorological Service,
Toronto, Ont.

SIR, —I have the honour to present my annual report of the St. John Observatory for the fiscal year ending June 30, 1904.

The work of meteorological observation, records and reports has been continued without change from my previous report. The instruments are in excellent condition and no trouble has been experienced with the automatic recording registers.

The morning bulletin, received by wire from Toronto, has been daily published, distributed and posted, in accordance with my former reports. The forecasts, weather notes and general conditions at adjacent coast and interior stations afford most valuable and important information to mariners, shippers of perishable goods and other interests directly affected by weather changes, besides being of great utility and interest to the public generally. In addition to the bulletin daily issued from this office all of our daily papers publish the reports.

Upon receipt of telegrams from Toronto storm warning signals are displayed at the signal station. The electric lights used for night signals have been most satisfactory and there is now no complaint of lamps giving out or indistinctness of the night signal. The forenoon forecasts as well as storm warning messages have been telephoned

4-5 EDWARD VII., A. 1905

to St. Martins and the storm signals displayed at the lighthouse for the benefit of mariners in that portion of the Bay of Fundy.

Information from the meteorological records is frequently required for settlement of various claims, and at times, statements are made for or evidence given in the courts.

In connection with the time service, observations of stars have been made nearly every clear night with the meridian telescope, for determination of errors and rates of the standard sidereal clock. The observations as well as clock comparisons have been registered on the recording chronograph.

The time ball for the use of shipping, has been dropped at 1 p.m. (60th meridian time) every week day throughout the year. Signals from the mean time transmitting clock have been telegraphed every week day morning, through the Western Union Telegraph Company, to all points in the maritime provinces, for the two minutes ending at 10 a.m.; giving the standard of time for this portion of the Dominion. It is used by navigators for chronometer comparisons in many of our ports, and at Halifax by the war ships of the British and foreign fleets, as well by the British, French and American cable ships. Special time signals have frequently been sent to the navy, cable ships and navigators of the merchant marine. Time signals are also locally transmitted by telephone, the seconds' beats on the sounder connected with the transmitting clock being audible through the telephone.

During the year the upper portion of the transit pier was renewed, it being found that this portion of the pier had become unstable and was not sufficiently massive to support the new and much heavier meridian telescope. A new electric release was fitted to the time ball, the old apparatus being much worn and difficult to keep in adjustment.

In June last, the Department of Public Works installed a clock in the lobby of the St. John Post Office. This clock is connected by wire with a standard mean time clock in the observatory and is automatically corrected every hour, day and night.

The various electrical devices connecting the observing key and sidereal and mean time clocks with the chronograph, and the electrical apparatus for disseminating time signals have given perfect satisfaction.

I have the honour to be, sir, your obedient servant,

D. L. HUTCHINSON,
Director, St. John Observatory.

APPENDIX 'B'

To the Director,
Meteorological Service,
Toronto.

QUEBEC, 8th August, 1904.

SIR,—I have the honour to transmit my annual report for the fiscal year ending June 30, 1904.

My duties have been the same as in former years.

The ordinary meteorological observations were taken daily at the observatory.

The time was determined by transit of stars every fine night and also by the sun.

The time ball on the Citadel is in good working order. It was dropped for the first time this year on the 25th April, date of the opening of navigation at Quebec.

I have the honour to be, sir, your obedient servant,

ARTHUR SMITH.

SESSIONAL PAPER No. 21

MAGNETIC OBSERVATORY.

Lt.-Col. F. GOURDEAU,
Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to report that during the fiscal year ending June 30, 1904, there were no mechanical changes in the magnetic instruments. Chronometer No. 3332 has after many years service been disabled through breaking of main spring and is now in Toronto for repairs.

The photographic curves of declination, horizontal force and basement temperatures have been maintained throughout the year with considerably less than the average percentage of loss of record. The ordinates of these curves have been measured at hourly intervals and at the times of maximum and minimum amplitudes; the results have been tabulated; the daily and hourly means computed and reduced to absolute values in form for publication.

The absolute observations for declination, inclination and horizontal force, have been regularly taken and compared with the photographic results of differential instruments as also with the auxiliary scales attached to same.

Accuracy of time markings on traces has been assured by daily chronometer comparisons and weekly time exchange with Toronto.

Special information has from time to time been prepared at the request of directors of observatories and other correspondents with reference to magnetic disturbances, &c.

The usual meteorological observations, consisting of maximum and minimum and incidental readings of temperatures; anemograph records of velocity and direction of wind, measurements of rainfall, &c., have been maintained throughout year and results forwarded to the Central Meteorological Office.

Mr. Menzies, the observer in charge at the observatory, continues to reside in a house the lease of which will expire on April 1, 1905, and as yet I have been unable to learn whether it can be renewed. The lessor has always objected to making any repairs and as all arrangements are of a primitive character, Mr. Menzies and his family are subjected to much domestic discomfort, especially during the winter months.

The erection of an observer's residence near the observatory would probably be the best solution of the difficulty.

All of which is respectfully submitted.

R. F. STUPART,
Director.

APPENDIX No. 6

REPORT OF THE CHAIRMAN OF THE BOARD OF STEAMBOAT INSPECTION.

CHAIRMAN'S OFFICE,
OTTAWA, November, 1904.

To the Deputy
Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit the annual report of the working of the Steamboat Inspection Service for the fiscal year ending June 30, 1904.

It represents the general work of the service during the period mentioned, giving the number of steamboats inspected in the several divisions and their gross tonnage, with the amount of dues collected, as shown by the inspectors on account of inspection, with a statement of the board meetings held.

The steamboats inspected, their tonnage, &c., the fees received for engineers' examinations with the names of candidates and the grade of certificate issued, also the penalties enforced for violations of the Steamboat Inspection Act; the casualties occurring as reported from the several divisions, with the reports as to the number of vessels added thereto, will be found in supplement No. 1 to this report.

In addition to the steamboats inspected at the port of Montreal, the ship's tackle and hoisting gear used for the purpose of loading and unloading those vessels to the number of 427, were also inspected by the steamboat inspectors of that port.

During the year owing to the increase of work there has been added to the staff two additional boiler and machinery inspectors, one for the port of Sorel, province of Quebec, and one for the West Ontario Division, to have office located at Collingwood, Ont. A new appointment has also been made to fill the position of boiler and machinery inspector at St. John, N.B., rendered vacant owing to the demise of previous incumbent as mentioned in former report.

NUMBER of steam vessels reported as shown by the inspectors of steamboats in the Dominion, and their gross tonnage, for the year ended June, 1904; also the number of vessels inspected but not registered in the Dominion for same date.

DIVISION.	Number of Dominion registered steamers.	Gross tonnage of Dominion registered steamers.	Number of steamers inspected but not registered in the Dominion.	Gross tonnage of steamers inspected but not registered in the Dominion.
West Ontario.....	478	100,525·00	36	20,907·00
Kingston.....	173	23,390·31	30	2,501·91
Montreal.....	203	22,766·00	2	2,671·00
Sorel.....	77	20,667·66	2	1,853·08
Quebec.....	82	15,422·00	2	1,351·00
Nova Scotia.....	144	22,321·51	22	29,322·11
New Brunswick and Prince Edward Island.....	135	15,815·85	9	11,727·26
British Columbia and Yukon Territory...	267	65,939·43	24	29,946·27
Manitoba and North-west Territories.....	132	8,215·06	4	1,197·73
Total.....	1,691	295,062·82	131	101,477·36

SESSIONAL PAPER No. 21

NUMBER of Dominion registered steam vessels inspected and their gross tonnage, with the amount of fees collected on account of steamboat inspection, during the year ended June 30, 1904.

DIVISION.	Number of Dominion registered steamers inspected.	Gross ton- nage of Dominion registered steamers inspected.	Amount of fees col- lected on ac- count of steamboats inspection.
			\$ cts.
West Ontario.....	391	97,266·00	1,983·43
Kingston.....	166	22,953·42	211·68
Montreal.....	170	21,382·00	226·68
Sorel.....	68	20,415·30	
Quebec.....	93	17,900·00	79·68
Nova Scotia.....	137	25,527·56	2,577·76
New Brunswick and Prince Edward Island.....	125	15,532·73	985·08
British Columbia and Yukon Territory.....	246	59,311·09	2,517·20
Manitoba and North-west Territories.....	91	7,165·91	95·76
Inspection of tow barges.....			30 00
Engineers certificates.....			1,079·50
Total.....	1,487	287,454·01	9,786·77

BOARD MEETINGS.

November 18, 1903.—A meeting of a quorum of the Board of Boiler and Machinery Inspectors composed of Joseph Samson, of Quebec, J. P. Esdaile, of Halifax, and E. Adams, chairman, was convened at St. John, N.B., for the purpose of examining candidates for the position of boiler and machinery inspector for that district, necessitated by the demise of former incumbent. The result of which, Mr. C. E. Dalton, of St. John, was appointed to fill the vacancy.

Consideration was also given to the question of revising the qualifications as required for firemen's service in order to obtain a 4th class engineer certificate, and was recommended that the thirty nominal horse power as required, be reduced to sixteen and also that service on steamboats having an engine of not less capacity than eighteen thousand inches of cylinder volume, be also included, which was recommended.

The matter of certificating vessels propelled by power derived from naphtha, gasoline or similar fuel, for the purpose of the carriage of passengers, was taken into consideration, which was not favourably considered under the existing conditions.

Toronto, December 15, 1903.—A meeting of the Board was convened composed of J. Dodds, E. W. McKean, W. Evans, of Toronto, and E. Adams, chairman, for the purpose of examining a vessel propelled by power derived by gasoline, requiring to be certificated for the purpose of carrying passengers for hire, which under the conditions the Board did not consider it in the interest of public safety to so do. The matter as to the safety of certificating boats driven by power derived by such means was fully considered, when it was decided that under stipulations as provided, they might be certificated, and deferred the matter for further inquiry and consideration.

Toronto, January 22, 1904.—A meeting of a quorum of the Board was convened, composed of J. Dodds and E. W. McKean, Toronto, J. P. Thompson, of Kingston, W. Laurie, of Montreal, and E. Adams, chairman. An examination of candidates for the office of boiler and machinery inspector was held, resulting in the appointment of Mr. J. B. Stewart to the office for West Ontario Division, and Mr. Alexis Rondeau to the office for Sorel Division, province of Quebec.

The question of certificating boats driven by power derived from gasoline, naphtha, or such material, was again considered, and the results of former meetings submitted for consideration, which were closely discussed by the members present, when it was

4-5 EDWARD VII., A. 1905

unanimously decided to recommend the conditions to be exacted before certificating such vessels, and that provision be provided for giving effect to same, which has been carried out and provided for whereby such boats may be certificated for the purpose of carrying passengers for hire.

The revising of the qualifications for firemen's service in order to obtain 4th class engineers' certificates as approved by the Board at St. John, N.B., was also considered and recommended to be approved.

PROSECUTIONS WITH PENALTIES ENFORCED FOR VIOLATION OF THE STEAMBOAT INSPECTION ACT.

July 13, 1903.—The collector of customs at St. Stephens, N.B., seized the schooner *Hustler* for carrying an excursion in tow of a tug boat without being certificated and equipped as required by the Steamboat Inspection law; and exacted a penalty of \$100, of which owing to representations and extenuating circumstances as set forth to the Honourable the Minister of Marine and Fisheries, \$75 of the penalty was remitted to the owners and the balance retained to defray the expenses incurred in connection therewith.

July 15, 1903.—Complaint was made to the department that the tug *Sparrow* had in tow a scow having an excursion on board at Callander, Ont., and not being equipped or certificated for that purpose. The case was submitted to the Department of Justice to take legal proceedings against the owner of the vessel for violation of the law, and was tried before a stipendiary magistrate at North Bay, Ont., when a fine of \$50 was imposed, and in which from the nature of the case, the magistrate stated that had he any discretionary power the fine would not have been imposed, and that he would be glad to recommend remission of penalty; which was submitted with the extenuating circumstances for the consideration of the Honourable the Minister of Marine and Fisheries, who under the conditions remitted the penalty, the owners paying the legal expenses \$12.60 incurred by the department, which was complied with.

CASUALTIES.

The following are the casualties reported from the several districts as having occurred during the fiscal year ending June 30, 1904.

West Ontario Division.

On July 12, 1903, the steamer *White Star*, of Montreal, while lying at her wharf at Toronto, took fire and was damaged to such an extent as to require a thorough rebuild; the cause of fire is unknown. The steamer has been taken to Montreal to receive the necessary repairs.

On August 18, 1903, the steamer *Hiram R. Dixon*, of Owen Sound, was totally destroyed by fire at Michipicoten island; cause of fire is unknown.

On August 19, 1903, the steamer *Britannic*, of Montreal, while en route between Parry Sound and Collingwood, the walking beam of the engine broke, destroying the cylinder and condenser; the steamer was towed to Collingwood and the engine repaired.

On August 22, 1903, when the steamer *Erin*, of St. Catharines, (loaded with railroad iron) was on her way up from Montreal, she collided with the canal pier at Farren's Point and sank; the steamer was raised and taken to Kingston, where the necessary repairs were made.

On August 30, 1903, the steamer *Pittsburg*, of Toronto, while lying at her quarters for the winter at Sandwich, took fire and was totally destroyed. The cause of fire is unknown.

On September 10, 1903, the tug *Reliance*, of Owen Sound, while in the vicinity of John's island, near Spanish river, took fire and was partially destroyed; the steamer was taken to Midland and thoroughly repaired; cause of fire is unknown.

SESSIONAL PAPER No. 21

On October 25, 1903, the steamer *Advance*, of Toronto, while being unloaded at Sault Ste. Marie, Ont., was partially destroyed by fire; the steamer is now at Kingston being repaired; cause of fire is unknown.

On November 10, 1903, the steamer *Atlantic*, of Collingwood, was totally destroyed by fire at Red rock, near Parry Sound; the steamer had encountered very rough weather while coming from Collingwood, and was leaking to such an extent, that the water rose in the hold coming in contact with unslacked lime (part of the cargo) which was stowed in the bottom of the hold, causing the ignition of the rest of the cargo.

On November 11, 1903, the steamer *Oriole*, of Toronto, was totally destroyed by fire at the mouth of the Wye river, near Midland; cause of fire is unknown.

On November 17, 1903, while the steamer *Erin*, of St. Catharines (having in tow the schooner *Danford*) was on her way down Lake Superior, one of the eccentric rods broke, disabling the engine; a heavy sea was running at the time, and the towline parted, when the vessels separated; the *Erin* encountered severe weather for several days, and grave fears were entertained for her safety. She was finally located in the vicinity of Gargantua by the tug *C. E. Ainsworth*, and towed to Sault Ste. Marie, Michigan, where the necessary repairs were made to the engine; the schooner *Danforth* had previously arrived at Sault Ste. Marie.

On November 21, 1903, the steamer *Gem*, of Toronto, was partially destroyed by fire at Huntsville; the steamer has been rebuilt.

On June 19, 1904, the steamer *Joe Milton*, of Port Stanley, in a dense fog, ran aground near Pappoose island, Georgian bay, immediately after stranding she caught fire and was totally destroyed; the fire is supposed to have been caused by the upsetting of a lamp, which occurred by the shock of the steamer going aground.

East Ontario Division.

On July 5, 1904, the paddle passenger steamer *Alexandria*, of Picton, Ont., when on a trip between Montreal and Sorel, broke her piston rod, which resulted in the breaking of the cylinder, condenser and steam chest. No loss of life occurred. The steamer was towed into Sorel for repairs.

Montreal Division.

On October 26, 1904, ss. *Advance*, while lying at the wharf at Sault Ste. Marie, the cargo under the main deck took fire. The crew made every effort to extinguish it, but finding it impossible to do so, the ship was towed over to the American side and they sank her in 20 feet of water. She was afterwards pumped out and raised.

On June 16, 1904, steamer *Valleyfield*, while fitting out in the canal at Valleyfield, took fire and was partially burnt; cause of fire unknown. She has since been repaired.

Quebec and Sorel Division.

On August 12, 1903, screw tug *Mersey*, of Quebec, while in commission sprung a leak and sank at Pointe aux Outardes, by which five of the crew lost their lives.

On August 19, 1903, the paddle steamer *Carolina* ran ashore at Passe Pierre, owing to a dense fog, she was subsequently floated and brought to Sorel, repaired and put into seaworthy condition; there was no loss of life.

On June 12, 1904, the paddle steamer *Canada*, on her trip from Quebec to Montreal, when near Sorel collided with steamer *Cape Breton* and sunk in thirty feet of water, causing the death of four passengers and one of the crew; an endeavour is being made to again float her.

New Brunswick and Prince Edward Island Division.

On September 19, 1903, the paddle steamer *David Weston*, of St. John, N.B., plying between St. John and Fredricton, caught fire on the down trip, was beached in a

4-5 EDWARD VII., A. 1905

few minutes and all the people were saved with the exception of three passengers who leaped overboard and were drowned. Vessel a total loss.

April 26, 1904, ss. *Elliot*, of Charlottetown, when proceeding on a sealing voyage in the Gulf of St. Lawrence, got caught between two ice fields, so that the outer stern post and rudder were carried away, the tail shaft bent and propeller broken, and drifting around got beached in Atlantic cove, where she was condemned, as she was leaking so badly it was impossible to keep her free. No lives were lost.

June 20, 1904, screw tug *Carrie Knight*, while lying at the wharf undergoing repairs caught on fire and was totally destroyed ; cause of fire unknown. No fatalities.

Nova Scotia Division.

November 2, 1903, screw tug *Henry Hoover*, of Halifax, owing to a collision was sunk in Halifax harbour. No lives lost.

March 29, 1904, ss. *Louisburg*, of Montreal, grounded at Louisburg, N.S., and sustained damage which caused her to sink, she was subsequently floated and brought to Halifax, where she was repaired and put in seaworthy condition.

June 12, 1904, ss. *Cape Breton*, of Montreal, collided with the paddle steamer *Canada* in the St. Lawrence river, the latter steamer was sunk and five lives lost thereby. The *Cape Breton* was brought to Sydney, repaired and put in a seaworthy condition.

Manitoba and North-west Territories.

August 29, 1903, steamer *Keewatin*, of Winnipeg, while moored at the dock at Keewatin, caught on fire and was totally destroyed. Cause of fire unknown.

September 4, 1903, steam yacht *Grace B*, while lying in the boat house at Rat Portage was destroyed by fire with boat house.

April 28, 1904, stern paddle steamer *Gertie H*, while on a trip down the Red river at Winnipeg, ran against a partly opened draw of C.P.R. bridge, tearing off her upper house, caught on fire and was totally destroyed.

British Columbia and Yukon Territory.

August 24, 1903, ss. *Pilot*, of Victoria, B.C., 279 tons gross tonnage, on a voyage from Juneau, Alaska, off Cape Fanshaw, broke her crank shaft ; temporary repairs were made at Juneau, when she proceeded to Victoria, where a new shaft was made and fitted.

December 15, 1903, ss. *Amur*, of Victoria, B.C., 907 tons gross tonnage, on voyage from Alaska to Victoria, stranded on Eastern edge of Harbour reef, Port Simpson, during a fog, breaking the tail shaft ; she was hauled off to wharf and a new shaft fitted ; afterwards proceeded to Victoria where hauled out on marine slip ; damage eighteen plates renewed on bottom and bilge.

February 13, 1904, ss. *Tees*, of Victoria, 679 tons gross tonnage, on a voyage from Northern, B. C. ports to Victoria, stranded on eastern side of Trial island, was floated off on following day and brought to Victoria where hauled out on Marine ways ; damage to twenty-nine plates, twenty-four of which were renewed.

February 15, 1904, ss. *Halys*, of New Westminster, B.C., 44 tons gross tonnage, whilst lying at Pilot bay, B.C., caught on fire, no one was on board at the time. A total loss.

March 25, 1904, ss. *Mermaid*, of Vancouver, 129 tons gross tonnage, while running at full speed in Jervis inlet, struck on rocks and stove in her bows, when she flooded and sunk in deep water. A total loss ; no lives lost.

October 18, 1903, freight steamer *Champion*, of Vancouver, B.C., 100 tons gross tonnage, was destroyed by fire in Ladysmith harbour ; the fire was caused by water getting into her cargo of lime.

June 20, 1904, screw tug *Lois*, of Vancouver, B. C., 25 tons gross tonnage, was totally wrecked by running on to a rock in Howe Sound, B. C. No loss of life.

I am, sir, your obedient servant,

EDWARD ADAMS,
Chairman, Board of Steamboat Inspection.

APPENDIX No. 7.

ANNUAL REPORT OF THE OFFICER COMMANDING MARINE SERVICE
OF CANADA.

To the Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit a report on the several services under my superintendence. These services embrace the following branches at headquarters :—

Wireless Telegraphy,
Dominion Steamers,
Dominion Cruisers,

Pilotage,
Investigations into Wrecks,
Fisheries Intelligence Bureau.

Separate reports on wireless telegraphy, marine schools, investigations into wrecks, and pilotage form Appendices 11, 10, 8 and 9, and the reports on the work of Dominion cruisers and Fisheries Intelligence Bureau, will be found in the Fisheries Report.

I have much pleasure in testifying to the good work done by captains and officers of the various vessels under my command during the past year.

The following vessels comprise the Dominion steamer fleet. These vessels are employed nearly inclusively in lighthouse and buoy work :—

Lansdowne,
Aberdeen,
Druid,
Brant,
Quadra,

Lady Laurier,
Gulnare,
Minto,
Stanley,
Maisonneuve,

Frontenac,
Shamrock,
Scout,
Bayfield,
Reserve.

The Steamers *Minto* and *Stanley* keep communication open between Prince Edward Island and the mainland during the winter.

The *Gulnare* is employed exclusively in the tidal survey work, and a synopsis by Doctor W. Bell Dawson of the work done by her will be found in the chief engineer's report.

The *Maisonneuve* is principally employed under the commissioner of lights in patrolling the channel between Kingston and Quebec for the purpose of ascertaining if the buoys, &c., are in position.

The *Bayfield* is employed, under Mr. W. J. Stewart, officer in charge of the hydrographic surveys, in Lake Superior. A full report of his work will be found elsewhere.

The *Frontenac* is a powerful tug, employed in the St. Lawrence ship channel, under the direction of Mr. Cowie.

The *Shamrock* is employed under Mr. U. P. Boucher, agent of the Department of Marine and Fisheries in Montreal, in the buoy service between Montreal and Quebec.

The *Scout* and *Reserve* are two vessels employed under the commissioner of lights, in the lighthouse and buoy service between Montreal and Kingston.

The cruiser fleet consists of the following ships, and a report of the work done by each will be found in the Fisheries Report :—

Kingfisher,
La Canadienne,
Petrel,

Osprey,
Curlew,
Constance,

Falcon,
Kestrel,

4-5 EDWARD VII., A. 1905

The Department of Marine and Fisheries have had constructed four new vessels during the past year, the *Canada*, *Vigilant*, *Montcalm*, and *Champlain*.

The *Canada* and *Vigilant* are both armed small third class cruisers, the former built by Vickers, Sons & Maxim, of Barrow in Furness, under the superintendence of Mr. D. M. A. Mooney, and the latter by the Polson Iron Works, of Toronto, under the superintendence of Mr. Douglas Stevens, inspector of government steamboats.

The *Champlain* is a small vessel built as an ice-breaker, and her work will be principally confined to keeping navigation open between River Ouelle and the north shore of the St. Lawrence both winter and summer. The *Montcalm* is a very powerful and large ice-breaker. She is also intended to act as a lighthouse and buoy ship during the summer season. Her principal duties during the coming winter will be to endeavour to keep the ice bridge from forming at Cap Rouge, River St. Lawrence. A very successful trial was made on the 17th instant, and the work this vessel was able to perform: when she cut through solid ice of an average thickness of nine inches without the slightest difficulty. These two latter vessels were built by Messrs. Fleming & Ferguson, of Paisley, Scotland, under the superintendence of Captain McElhinney, of this department.

The following are the dimensions, speed, armament, &c., of the different vessels controlled by this department:—

‘MINTO.’

The *Minto* is an iron steamer 225 feet long, 32 ft. 6 in. beam, and 20ft. 6in. depth, with a gross tonnage of 1,099 tons, indicated horse power 2,900. She is commanded by Captain A. Finlayson and, as before stated, she is principally employed in keeping winter navigation open between P. E. Island and the mainland, but during the past season she has been very actively employed in assisting in the erection of the different Marconi stations in the Gulf and River St. Lawrence, and also in testing the capabilities of these stations in regard to the distance communication can be carried on. This vessel is fitted with the Marconi apparatus.

‘KINGFISHER.’

The *Kingfisher* commanded by Captain Kent, is a sailing cruiser, 107 ft. long, and has done excellent work looking after United States fishermen and carrying out our own regulations. She is, however, thirteen years old and is now being advertised for sale. Her place on the Atlantic coast will be taken next season by the steam cruiser *Petrel* which vessel, up to date, has been employed in Lake Erie.

‘LANSDOWNE.’

The *Lansdowne* is a wooden steamer, commanded by Captain Bissett, employed in lighthouse and buoy work in the Bay of Fundy. She recently had new boilers fitted and she is now ready for a considerable period of further service. She is 188 feet long, 32 ft. wide, 15 ft. deep, with a gross tonnage of 680 tons.

‘GULNARE.’

This vessel is commanded by Captain T. Taylor, and is employed entirely on tidal survey work. Her dimensions are as follows:—

Steel vessel 137 ft. long, 20 ft. 5 in broad, and 13 ft. 6 in. depth, gross tonnage 262 tons

‘MAISONNEUVE.’

The ‘*Maisonneuve*’ is a screw steamer 75 ft. 7 in. long, 9 ft. 7 in. broad, and depth of hold 7 ft. 3 in., with a gross tonnage of 26 tons.

SESSIONAL PAPER No. 21

' ABERDEEN.'

This vessel is employed in lighthouse and buoy work in the Quebec agency. She is an iron screw steamer 180 ft. long, 31 ft. broad and 16 ft. deep with a tonnage of 674 gross. She is commanded by Captain Belanger. After this vessel's work was finished this fall, it was intended to replace her old boilers which are unfit for service, with Thorneycroft-Marshall boilers, and for this purpose she was ordered to Toronto, but unfortunately she was unable to get through the canals on account of the ice, and is at present laid up for winter in the Soulanges. It is the intention that she should go to Toronto to have these boilers placed as soon as possible in the spring.

' PETREL.'

This vessel is a steel screw cruiser 116 ft. long, 22 ft. beam and 10 ft. 3 in. depth, with a gross tonnage of 192 tons. This vessel has done most excellent work in Lake Erie, looking after United States fishermen, but for the last few seasons she has been found to slow too cope with the American steam tugs which are used for fishing purposes on the upper lakes. It was therefore decided to replace her with a very much larger and faster ship, and send the *Petrel* to the Atlantic coast where steam fishing vessels are not in use and she will only have to cope with sailing schooners. She is commanded by Captain Dunn.

' STANLEY.'

The *Stanley* is an iron screw steamer 207 ft. long, 32 ft. beam, and depth of hold 19 ft., with a gross tonnage of 914 tons. She is commanded by Captain A. Brown. This vessel is principally used to keep communication open between P. E. Island and the mainland during the winter season, but like the *Minto*, this year she has been employed in erecting and testing the different Marconi stations placed by the government in the Gulf and River St. Lawrence. Her boilers and engines have been thoroughly overhauled and she has been fitted with an entirely new set of tubes recently.

' BAYFIELD.'

The *Bayfield* formerly the *Lord Stanley*, is a steamer and, as before stated, is entirely engaged in hydrographic work on the upper lakes. She is 140 ft. long, 24 ft. 1 in. broad and depth 11 ft. 6 in. and a gross tonnage of 276 tons. She is a very powerful ocean-going tug.

' OSPREY.'

This is a sailing schooner, employed in the Fisheries Protection Service on the Atlantic coast. She is 127 ft. long, and was built in Shelburne, Nova Scotia, and for some years was the fastest sailing schooner on the Atlantic coast. She is still very fast but there is no doubt that some of the United States fishing schooners are as good as she is now. She was commanded during the first part of the season by Captain Knowlton, and during the latter part by Mr. Graham.

' DRUID.'

The *Druid* is lighthouse and buoy ship employed in the Quebec agency. She is a twin screw steamer 160 ft. long, breadth 30 ft., depth of hold 12 ft. 5 in., with a tonnage of 503 tons, and is fitted with triple expansion engines. She was built by Messrs. Fleming & Ferguson, Paisley, Scotland, in 1903, and is commanded by Captain Koenig.

4-5 EDWARD VII., A. 1905

'BRANT.'

The *Brant* is employed in the lighthouse and buoy service in Prince Edward Island. This is a wooden steamer 100 ft. long over all, 19 ft. broad and 8 ft. deep. This vessel is also employed in the fisheries protection service when necessity arises. She is commanded by Captain McKinnon.

'QUADRA.'

This vessel is employed in lighthouse and buoy service in British Columbia. She is an iron steamer 174 ft. long, 31 ft. beam, and a depth of 13 ft. 6 in., with a gross tonnage of 573 tons. She is commanded by Captain Hackett. This vessel, though doing good work on the Pacific, is now not large enough or fast enough for the large number of extra aids to navigation which it is considered necessary to place on this coast, and I would recommend that a vessel more suitable for the work which has to be performed, should be built as soon as possible. This vessel was thoroughly inspected last September by the honourable the minister, the deputy minister and myself, and various and important changes agreed upon in reference to accommodation, &c., which have been carried out.

'LA CANADIENNE.'

This vessel was employed in the protection of the fisheries of the lower gulf, under the command of Commander Wakeham. She is an iron screw steamer 154 ft. long, 22 ft. beam, and 10 ft. 9 in. deep, with a gross tonnage of 372 tons. This vessel, in addition to fisheries protection work, in the fall of the year materially assists the Quebec agency in taking in buoys and in various other kinds of marine work.

'SHAMROCK.'

This vessel is employed in the buoy service between Montreal and Quebec. She is a steam barge 117 ft. long, 25 feet beam, and 9 ft. 7 in. deep, with a gross tonnage of 237 tons. She is under the charge of Mr. U. P. Boucher, agent of the Department of Marine and Fisheries in Montreal.

'CURLEW.'

This is a twin screw iron steamer 116 ft. long, 19 ft. 8 in. wide, and 11 ft. 3 in. deep; gross tonnage, 158 tons. She is employed in fisheries work in the Bay of Fundy and western coasts of Nova Scotia, and is under the command of Captain Pratt. She also assists in marine work when necessary.

'CONSTANCE.'

The *Constance* is a sister ship of the *Curlew* and is employed in revenue work in the River St. Lawrence and Atlantic coast. She is controlled entirely in regard to her movements by the Customs Department, but is managed in reference to expenditure, crew, &c., by this department. She is commanded by Captain May.

'LADY LAURIER.'

The *Lady Laurier* is a twin screw steel steamer, commanded by Captain Johnson. She is 214 ft. 9 in. long, 34 ft. 2 in. broad with a depth of 17 ft. 2 in., tonnage gross 1,051. She is employed in the lighthouse and buoy service on the Atlantic coast and is attached to the Nova Scotia Agency. She was built in 1902 to take the place of the late steamer *Newfield*. She is a very powerful and staunch steamer eminently fitted for

SESSIONAL PAPER No. 21

he work she has to perform. A considerable sum of money was expended on her some time ago owing to an accident which happened to her at Lockeport, N.S.

‘SCOUT’ AND ‘RESERVE’

Are two steamers used in connection with the buoy service between Montreal and Kingston. The *Reserve* is used for sweeping the river and is also used for towing scows employed for the purpose of placing buoys in position. The *Scout* is furnished with electric light and a powerful searchlight. Her dimensions are 103 ft. 6 in. long, 25 ft. 6 in. beam, depth 9 ft. 2 in., gross tonnage 175.

‘FALCON.’

The *Falcon* is a small steamer employed in the protection of the fisheries in British Columbia waters. She is 50 ft. long, 15 ft. beam, 3 feet draft with a gross tonnage of 52 tons. An account of her work will be found in Inspector Williams’ report, in the fisheries part of the departmental report.

‘KESTREL.’

The *Kestrel* is also employed in the protection of the fisheries in British Columbia waters. This vessel is 126 ft. long, 24 ft. beam, 12 ft. 2 in. depth, with a gross tonnage of 311 tons. She is a wooden vessel and commanded by Captain Newcomb.

‘CANADA’.

In reference to the four new steamers, the *Canada* is a twin screw small third class cruiser with a speed of $21\frac{1}{4}$ miles an hour. She was built by Vickers, Sons & Maxim, at Barrow in Furness, England, is armed with four $1\frac{1}{2}$ pounder quick firing automatic mark 3, 1904 guns: two forward and two aft. Electrically lighted throughout and fitted with a very powerful search light. She arrived from England last September, and has proved a very great success in the work for which she was designed to perform. It is the intention that this vessel should make a cruise to the West Indies during the winter, and proposal is, if possible, to have her attached to the North American Squadron. She carries a crew of 75 officers and men all told, and is fitted with the Marconi apparatus. Her dimensions are as follows:—200 ft. long, 25 ft. beam and 10 ft. 6 in. draft of water, with a gross tonnage of 850 tons. She is commanded by Captain Knowlton, and a number of the officers and crew have been through a course of instruction and received 1st class certificates in gunnery. This vessel is also armed in the way of small arms, with the new pattern Ross rifle, and the New Service D.A., Colt’s revolvers. It is intended that this vessel should form the nucleus of the proposed Canadian Naval Militia.

‘VIGILANT.’

The *Vigilant* is a steel twin screw, small 3rd class cruiser, built by the Polson Iron Works, Toronto. This vessel on her steam trial made a speed of $21\frac{1}{2}$ miles an hour. She is 175 ft. long, 22 ft. beam, and draws 10 ft. of water. She is electrically lighted throughout and fitted with a powerful search light. She carries the same guns and the same small arms as the *Canada*, and is intended for the protection of the fisheries on the great lakes in place of the *Petrel*. She is commanded by Captain Dunn. This vessel is the first of her class ever built in Canada, and is a credit in every way to the Polson firm of Toronto. She carries a crew of officers and men all told, of 53.

4-5 EDWARD VII., A. 1905

'MONTCALM.'

Is a screw steel ice-breaker, length over all 252 ft., breadth outside 40·65 ft., depth, bottom of keel to top of deck 19·05 ft., displacement 2,130 tons, two sets of triple expansion engines, speed $13\frac{1}{2}$ knots, with 4 Babcock & Wilcox water tube boilers, gross tonnage 1,432 tons, indicated horse power 3,600, built by Messrs. Fleming & Ferguson, Paisley, Scotland. The purposes for which this vessel is intended have been referred to previously in this report.

'CHAMPLAIN.'

Is a single screw steel steamer. Length over all 132 ft., breadth outside 30 ft. 3 in., depth from top of deck to bottom of keel 11 ft. 3 in., displacement 550 tons, indicated horse power 850, her speed at trial $10\frac{1}{2}$ knots, she is fitted with one simple compound, surface condensing engine, and one multitubular Scotch boiler. The work for which this vessel is intended is also referred to previously in this report.

In addition to the above named vessels, the department in 1903, chartered the sealing steamer *Neptune* from Job Brothers, of St. John's, Newfoundland. This vessel returned from the far northern waters of Canada, on October 12 of this year, having practically succeeded in doing what she was sent north for. A full report of the work done and the information obtained will be found in Mr. A. P. Low's report, who was the officer in charge of the expedition. Mr. Low is also making a fuller and further illustrated report on this expedition, which will be published shortly in separate form.

In July last, the government decided to send a further expedition to Hudson's Straits and north thereof, and for this purpose, the German Antarctic steamer *Gauss* was purchased, and renamed the *Arctic*. This vessel with a detachment of Mounted Police on board, under the command of Superintendent Moodie, officer in charge of the expedition, and with Captain Bernier as Sailing Master, left Quebec in September, met the *Neptune* on her return voyage at Port Burwell, and proceeded through the Hudson's Straits and is at present wintering at Fullerton, on the south shore of Baffin's land. Now that the government has decided to investigate, thoroughly explore and establish police stations in these far northern parts of Canada, it will no doubt be necessary to continue it, and this will necessitate the purchase of a vessel next year, fitted for this work.

In addition to the above ships there are four sea-going steam patrol launches used on the Atlantic coast for the protection of the fisheries, and one on the River St. Lawrence in connection with the aids to navigation.

The officers and crews of the above mentioned ships number about 900 men all told.

NAVAL MILITIA OF CANADA.

A bill for the formation of a Naval Militia of Canada was prepared last session, but, I presume, owing to this matter requiring a great deal of discussion, it was laid over till the next session of Parliament.

I have the honour to be, sir,

Your obedient servant,

O. G. V. SPAIN,
Commanding Marine Service of Canada.

OTTAWA, December 21, 1904.

APPENDIX No. 8.

INVESTIGATIONS INTO WRECKS IN THE ST. LAWRENCE
RIVER AND GULF.

OTTAWA, December 6, 1904.

To the Deputy Minister
of Marine and Fisheries,
Ottawa.

SIR,—I beg respectfully to submit my report upon the casualties and accidents that have occurred in the River and Gulf of St. Lawrence during the past season of navigation.

Formal investigations were held into accidents to the following vessels :

SS. *Vancouver*.
SS. *Kensington*. } collision.
Barquentine *Kodan*. }
SS. *Athenia*. } collision.
SS. *Verax*. }

SS. *Vancouver*.
SS. *Turret Cape*.
SS. *Turret Chief*.
SS. *Catalone*.
SS. *Louisburg*.

My instructions are to investigate every casualty and to deal promptly with any carelessness or want of judgment shown by either pilots or shipmasters, in the navigation of Canadian waters.

The government is doing everything possible in the way of aids to navigation ; and the pilots between Montreal and Quebec are now under the control of your department.

An informal inquiry was held into the circumstances attending the foundering of the British ss. *Turret Bay*, whereby a loss of life ensued, and the finding is attached.

The total value of the trade *via* the St. Lawrence for the fiscal year ending June 30, 1904, was \$131,062,282 ; in 1903, it was \$132,019,550 ; in 1902, it was \$113,414,381 ; in 1901, \$111,500,341, and in 1900, \$97,948,377.

The ' Shipping Casualties Act ' was amended in 1903, and the following changes have been made :—

1. The minister may appoint a commissioner to hold formal investigations, in place of the necessity for a separate commission being issued for each casualty as required before.

2. A ' Statement of the Case ' need not be issued—as heretofore—before the commencement of the proceedings where a certificate is to be dealt with ; the defendants certificate may be cancelled or suspended after he has been furnished with a copy of the report or statement of the case, and had an opportunity of making a defence.

3. An investigation may be held into the stranding of any vessel, whether damaged or not.

Two assessors have been appointed for the ports of Montreal and Quebec respectively, Captain Archibald Reid, and Captain John Temple : these officers have been appointed for a term of three years, and in pursuance of Section 8 of the amended ' Shipping Casualties Act ', the Honourable the Minister of Marine and Fisheries, has appointed me a commissioner to hold investigations into all shipping casualties.

4-5 EDWARD VII., A. 1905

A full statement of wrecks and casualties that have occurred during the twelve months ended the 30th June, 1904, in Canadian waters and to Canadian sea-going vessels in other waters will be found in the supplement to this report.

I have the honour to be, sir,
Your obedient servant,

O. G. V. SPAIN,
Wreck Commissioner.

SS. 'VANCOUVER.'

In the matter of a formal investigation held at the Harbour Commissioner's Office, Montreal, P.Q. on Friday, May 27, 1904, before Captain R. Salmon, Wreck Commissioner, assisted by Capts. Archibald Reid and William Wallace, assessors, into the causes which led to the stranding of the British ss. *Vancouver*, official No. 87963, near Matane, on the south shore of the gulf of St. Lawrence, at or about 8.50 p.m. on Sunday, May 22, 1904.

Report of the Court.

The court having carefully inquired into the circumstances attending the above mentioned shipping casualty finds:—

1. That the ss. *Vancouver* was properly equipped and in a good and seaworthy condition when she left Liverpool, England.

2. That considering the state of the weather proper precautions were taken with regard to speed, and a good lookout was kept.

3. That the course was set with Cape Chatte abeam, was a safe and proper one to pass Matane if it had been made good.

4. That the coast in the vicinity where the vessel stranded is properly charted, but the presence of a modern fog signal at Matane would have given the master timely warning of the approach of the vessel to the land, and in the opinion of the court is urgently required. The bell buoy placed at the extremity of the shoal does not appear to be of much service to passing vessels, as it cannot be seen in thick weather and is silent in a smooth sea; in this particular instance it could not be heard at about 50 yards distance.

5. That the casualty was due to the vessel not making good her course, owing to the action of the ebb tide and the set of the current, caused probably by the north-east winds which had prevailed for some considerable time previously, and for which no allowance appears to have been made, but apparently no damage resulted from the stranding.

6. That the master committed an error of judgment in supposing his vessel to be two miles off the land and in maintaining such a fine course, when the conditions of the weather and the approach of darkness prevented accurate observations for distance being made; but under the circumstances the court does not consider there are sufficient grounds for censuring him.

(Signed) R. SALMON,
Wreck Commissioner.

We concur,
(Signed) ARCHIBALD REID,
Port Warden and Surveyor to Lloyd's Register.
“ WM. WALLACE,
Master ss. *Hungarian.*

MONTREAL, May 27, 1904.

SESSIONAL PAPER No. 21

SS. 'KENSINGTON' AND 'KODAN'.

In the matter of a formal investigation held at the Harbour Commissioner's Office Montreal, P.Q., on Friday, July 8, 1904, before Captain R. Salmon, Wreck Commissioner, assisted by Captains James Riley and James Harrison, assessors, into the circumstances attending the loss of the Danish Barquentine *Kodan* through collision with the British ss. *Kensington*, official No. 102155, on July 1, about 30 miles south of St. Pierre island, Atlantic ocean.

Report of the Court.

The court having carefully inquired into the circumstances attending the above mentioned shipping casualty, finds :—

1. That the ss. *Kensington* and the *Kodan* were provided with efficient appliances for making the sound signal required by Article 15 of the Rules and Regulations for the Prevention of Collisions at Sea.

2. That at the time of the casualty, both vessels were proceeding at a moderate speed, as required by article 16 of the said regulations.

3. That the *Kensington* was making the proper sound signals required.

4. That the *Kodan* did not comply with the said regulations, in that she sounded two blasts in quick succession instead of one blast required to indicate that she was on the starboard tack ; this mistake appears to have been made owing to the confusion of the mate and the lookout relieving each other, the lookout having been sent below to call the watch, and each sounding the fog horn.

5. That the casualty was caused by the improper use of the foghorn on board the barquentine *Kodan*.

6. That the master of the *Kensington* acted with promptitude and good judgment in rescuing the crew of the *Kodan*, and taking steps to destroy that vessel by setting her on fire in order to prevent her becoming a dangerous derelict.

(Signed) R. SALMON,
Wreck Commissioner.

We concur.

(Signed) JAMES RILEY,
JAMES HARRISON,
Assessors.

SS. 'ATHENIA' AND SS. 'VERAX'.

In the matter of a formal investigation held at the Admiralty Court, Court House, Quebec, on the 21st and 22nd of July, 1904, before Captain R. Salmon, Wreck Commissioner, assisted by Captain John Temple and Mr. Louis E. Morin, assessors, into the causes which led to the collision between the British ss. *Athenia* official number 119121 and the British ss. *Verax*, official number 97382, whereby serious damage resulted to the latter and slight damage to the former, on July 12, 1904, at about 1.10 a.m., in the River St. Lawrence, near Point St. Laurent, Island of Orleans.

Report of the Court.

The court having carefully inquired into the circumstances attending the above mentioned shipping casualty, finds :—

1. That before the collision occurred the ss. *Athenia* was proceeding on her voyage to Quebec, keeping the usual course, that is to say, she was well to the northward of the centre of the channel, and rounded Point St. Laurent in such a manner as to show her green light to any vessel approaching from the opposite direction.

4-5 EDWARD VII., A. 1905

2. That the ss. *Verax* was proceeding on her voyage from Three Rivers, P. Q., to Miramichi, N. B., and that before the collision she was not keeping her usual course, that is to say, she was hugging the north shore and the port side of the channel, showing her red light to vessels approaching from the opposite direction.

3. That both vessels displayed the lights required by Article two of the 'Regulations for Preventing Collisions at Sea'.

4. That the pilot of the ss. *Verax* did not comply with article 25 of the said regulations, in that he did not keep to that side of the fairway or mid-channel which lay on his starboard side.

5. That the collision was caused by the neglect of pilot David Arthur Bouffard to comply with article 25 of the said regulations.

6. That the master of the ss. *Athenia* did everything under the circumstances possible to avert the collision, and after the collision stood by the other vessel, until she was satisfied that she could be of no further service.

7. That the master of the ss. *Verax* did everything he could to avert the collision after coming on deck and he was justified in beaching his vessel in order to save her from sinking.

8. That material damage resulted from the collision and the stranding to the ss. *Verax*, but to what extent was not ascertained.

9. That considering the gravity of the offence committed, the court severely censures pilot David Arthur Bouffard, and sentences him to be fined the sum of \$300 (three hundred dollars), which fine shall be paid in four monthly instalments of \$75 (seventy-five dollars) each.

(Signed) R. SALMON,
Wreck Commissioner.

We concur.

(Signed) J. TEMPLE, Master Mariner,
LOUIS E. MORIN, President Corporation of Pilots,
Assessors.

SS. 'VANCOUVER.'

In the matter of a formal investigation held at the Harbour Commissioner's offices, Montreal, on Wednesday, July 20, 1904, before Captain, R. Salmon, Wreck Commissioner, assisted by Captain Archibald Reid, and Mr. Aubert Naud, assessors, into the causes which led to the stranding of the British ss. *Vancouver* official No. 87963, on the south side of the channel, about $2\frac{1}{2}$ miles below No. 2 lightship, Lake St. Peter, River St. Lawrence, at about 7.25 a.m., on July 2, 1904.

Report of the Court.

The court having carefully inquired into the circumstances attending the above mentioned shipping casualty, finds:—

1. That the ss. *Vancouver* was properly equipped and her steering gear was in good working order and condition, both before and after the casualty.

2. That the orders of the pilot, in regard to the handling of the vessel, were carefully carried out.

3. That the casualty was caused by the pilot injudiciously repeating his order to starboard while the vessel was moving on starboard helm, which had the effect of making the ship take a broad sheer, from which she could not recover in time to prevent stranding.

4. That no blame attaches to the master and officers of the *Vancouver* for the casualty.

SESSIONAL PAPER No. 21

5. That pilot Onésime Naud committed an error of judgement, and in consideration of this and his long experience and good record, the court is of the opinion that the case is fully met by the administration of a caution to the pilot, to exercise more judgment in the future.

(Signed) R. SALMON,
Wreck Commissioner.

We concur.

(Signed) ARCHIBALD REID,
Port Warden and Surveyor to Lloyd's Register.
AUBERT NAUD, Branch Pilot.
Assessors.

SS. 'TURRET CAPE'.

In the matter of a formal investigation held at the Harbour Commissioner's offices, Montreal, P.Q., on Saturday, September 24, 1904, before Captain R. Salmon, Wreck Commissioner, assisted by Captain Archibald Reid and Mr. L. E. Morin, assessors, the inquiry into the causes which led to the grounding of the British ss. *Turret Cape*, official No. 104283, on Goose Island shoal, River St. Lawrence, at about 2.30 a.m. on Sunday, September 18, 1904, whereby some damage to the vessel resulted.

Report of the Court.

The court having carefully inquired into the circumstances attending the above mentioned shipping casualty, finds as follows:—

The *Turret Cape*, coal laden, left Port Hastings, N.S., on September 14, bound for the great lakes, to call at Montreal on the way to discharge part cargo. The master, E. L. Stephen, and the mate, A. McIntyre, hold master's certificates of competency for the inland waters only; a Quebec branch-pilot, Joseph Delisle, who holds a sea-going master's certificate of competency, was engaged to navigate the vessel. All went well until the early morning of September 18, when the vessel was proceeding up the Beaujeu channel, and Delisle endeavouring to place her in the proper position with the Stone Pillars light bearing N.E. by E., over-ran his distance, and accelerated by the set of the ebb tide on his port bow, the vessel grounded on Goose Island shoal about 2.30 a.m., the weather being fine and the atmosphere clear at the time. The ship remained fast until 11.15 a.m., on the same day, when she came off without assistance, and proceeded on her voyage under her own steam. The extent of the damage sustained is not yet ascertained, but from the fact that the sounding pipe in No. 2 hole was set up through the deck and there is constant leakage into the forward ballast tanks, would indicate that it may be serious.

The court finds that pilot Joseph Delisle is solely to blame for the accident, in neglecting to take cognizance of the bearing of the West Narrows gas buoy ahead of his vessel as well as that of Stone Pillars light astern, instead of devoting his whole attention to the latter, for then he would easily have seen that he had over-run his distance. In consideration of this young pilot's record, which shows that in addition to the long term of seven years apprenticeship required to qualify him for his branch, he has been ambitious enough to take up deep water work and obtain the highest certificate procurable in Canada, the court is inclined to deal leniently with him for this his first mistake; he is required to pay a fine of one hundred dollars, payable in two monthly instalments of fifty dollars each.

Neither the master nor the mate of the *Turret Cape* have the requisite qualifications to embark upon coasting voyages, and the fact that a pilot with a sea-going master's certificate was employed to navigate on the coast will not exonerate them or their owners from the consequences of their acts.

4-5 EDWARD VII., A. 1905

From the evidence of Joseph Anderson it appears that it is customary for the man on the lookout to leave his station about every hour for the purpose of sounding the bells, being away from ten to fifteen minutes at a time on this duty; this is a most reprehensible practice, and cannot be too strongly condemned.

(Signed) R. SALMON,
Wreck Commissioner.

We concur.

(Signed) ARCHIBALD REID,
Port Warden and Surveyor to Lloyd's Register.
L. E. MORIN,
President Corporation of Quebec Pilots.

Montreal, September 26, 1904.

SS. 'TURRET CHIEF.'

In the matter of a formal investigation held at the Harbour Commissioners' offices, Montreal, P.Q., on Wednesday, 28th December, 1904, before Captain R. Salmon, Wreck Commissioner, assisted by Captain Archibald Reid and Mr. Wilbrod Gauthier, assessors, to inquire into the causes which led to the grounding of the British ss. *Turret Chief*, official No. 106600, at about 9.45 p.m., on Tuesday, 16th August, in the neighbourhood of Portneuf, River St. Lawrence, whereby serious damage resulted.

Report of the Court.

The court having carefully inquired into the circumstances attending the above mentioned casualty, finds as follows:—

The *Turret Chief* left Indian Cove, Quebec, about 6.30 p.m. on Tuesday, 16th August, drawing 6 feet forward and 9 feet aft; she was bound for Port Colborne, Ontario, in water ballast. Branch Pilot Néré Bellisle was in charge, and from the report of the master, he was perfectly sober and handled the vessel well until she took ground abreast of Portneuf river, the tide being about half flood at the time. She remained fast for about half an hour, coming off without assistance on the rising tide and proceeding on her way. At the time of the casualty it was raining slightly, but all lights were plainly visible. From the evidence before the court it is impossible to ascertain the extent of the damage, but the vessel was detained a week in dry dock undergoing repairs.

Pilot Bellisle is solely responsible for the accident, which was caused by his over-estimating the distance from the north shore. He produces a doctor's certificate showing his sight is defective, and explains that since he had an attack of la grippe in June, his eyes have given him trouble, although he had no reason to suspect his sight was defective when he took charge of this vessel, having passed a satisfactory examination in this respect before the opening of navigation this season.

Under the circumstances, the court will withhold his license until such time as he can produce satisfactory evidence of his ability to pilot vessels.

(Signed,) R. SALMON,
Wreck Commissioner.

We concur.

(Signed) ARCHIBALD REID,
Port Warden and Surveyor to Lloyd's Register.
“ WILBROD GAUTHIER,
President of the Montreal Pilots Committee.

MONTREAL, September 29, 1904.

SESSIONAL PAPER No. 21

SS. 'CATALONE'.

In the matter of a formal investigation held at the Harbour Commissioner's Offices, Montreal, on October 3, 1904, into the causes attending the grounding of the ss. *Catalone* on Longueuil shoal, on August 21, 1904, whereby serious damage resulted.

Report of the Court.

The undersigned having carefully perused all the evidence adduced in this case, with the concurrence of the two Nautical Assessors, finds as follows :—

That the steamship *Catalone*, of the port of London, England, left Sydney, Cape Breton, for Windmill point, Montreal, with a cargo of coal and no passengers, on the 17th of August last; her draft of water at the time of leaving port being 22 ft. 3 inch. forward and 25 ft. 4 inch. aft.

Damien Paquet, a Montreal pilot, was taken on board at Quebec, and was on board the ship at the time of the accident.

The court is of opinion that the casualty was caused by the failure of the steam steering gear to act promptly, to enable it to counteract the broad sheer which the *Catalone* appears to have taken, and which possibly might have been augmented owing to the momentary lack of watchfulness on the part of the man at the wheel.

From the evidence adduced it is apparent that on other occasions there has been trouble with this vessel's steam steering gear. In fact, on the first day out from Quebec, by the pilot's evidence, the gear jammed three times, and the court considers, in view of these circumstances, that the pilot was taking great risk in continuing the voyage before he was thoroughly satisfied that the steam steering gear was in proper order.

The cause of the casualty was the failure of the steam steering gear to work promptly, and the court considers that the captain and officers of the ship were not to blame, but that pilot Paquet should have been more careful in watching the ship, knowing as he evidently did, that there was a possibility of the steering gear not being absolutely reliable.

The court also wishes to bring to the notice of the owners of the *Catalone* the unreliability of the steam steering gear of this vessel on the voyage at present under consideration.

The court is thoroughly in accord with the remarks made by the gentleman representing the Shipping Federation in reference to the cut opposite Longueuil Church being very considerably widened, and also the depth which should be given to this cut, and the matter has been drawn to the attention of the Marine Department by its own officials, and no doubt steps will be taken as soon as possible to carry out the necessary work.

(Signed) O. G. V. SPAIN,
Wreck Commissioner.

We concur.

(Signed) ARCHIBALD REID,
Port Warden and Surveyor to Lloyd's Register.
WILBROD GAUTHIER, Pilot,
Assessors.

MONTREAL, November 19, 1904.

SS. 'LOUISBURG.'

In the matter of a formal investigation held at Wreck Commissioner's Court, Montreal, P.Q., on Saturday, November 19, and Monday, November 21, 1904, before Commander O. G. V. Spain, Wreck Commissioner, assisted by Captain Archibald Reid and Mr. Wilbrod Gauthier, assessors, to inquire into the causes which led to the grounding

4-5 EDWARD VII., A. 1905

of the British ss. *Louisburg*, near Champlain, River St. Lawrence, on Tuesday, November 15, 1904, at 6.25 o'clock, a.m.

Report of the Court.

The court having carefully inquired into the circumstances attending the above mentioned shipping casualty, finds as follows:—

That the *Louisburg*, of the port of Montreal, left Sydney, Nova Scotia, at 1.40 o'clock, p.m., on November 11, 1904, with a crew of twenty-two hands all told, and loaded with 2,107 tons of coal. Her draft of water at the time of leaving Sydney was 18 ft. 7 in. forward and 19 ft. 7 in. aft.

That the vessel after making a safe passage, and picking up a pilot at Quebec, anchored for the night a little distance above Batiscan on November 14.

The *Louisburg* got under weigh from this point at day light on the morning of the 15th, and after proceeding for about one mile went ashore.

That after removing about 1,000 tons of coal, and with the assistance of two tugs she floated at 6.15 o'clock, p.m., on November 17, and proceeded towards Montreal; from all reports no damage being sustained.

The *Louisburg* was commanded by Captain H. W. Gould, who holds a certificate of competency, sea-going, Board of Trade.

The vessel was fitted out with all requirements in the way of boats, &c., called for by the Board of Trade regulations, and the captain is an experienced mariner and has been connected with the St. Lawrence route for a number of years.

The steering gear of this vessel was in first class order and worked to the entire satisfaction of the pilot, captain and officers of the ship, and the wheelsman obeyed his orders promptly and accurately.

The court is of the opinion that the accident was caused by a grave error of judgment on the part of Nestor Arcand, the pilot in charge of the ship, in passing some 400 feet on the south side of a dredge which was anchored in the locality, and displaying the proper lights to inform vessels to pass on the north side; also in mistaking a boat's or shore light for a gas buoy, consequently passing on the wrong side of the buoy, which buoy was proved without doubt, by the evidence of Mr. Decarie, engineer, to be in exactly the proper position at the time of the accident. As all gas buoys between Quebec and Montreal are fitted with an intermittent flash light, it is hard for the court to understand how a pilot should mistake a shore or a boat's light for a gas buoy.

Taking into consideration the previous good record of pilot Nestor Arcand; that he has been twenty years a pilot and never met with an accident before, and has been twelve years with the Dominion Coal Co., the court has decided to fine the said Nestor Arcand the sum of sixty (\$60), which fine is to be paid in three monthly instalments, beginning on January 1, 1905.

The court does not consider that in fining pilot Nestor Arcand sixty dollars (\$60), the punishment is at all commensurate with the lack of carefulness displayed by him on this occasion, more especially taking into consideration the keen anxiety evinced by the government to provide every possible aid to navigation, and it simply wishes leniency in this case to be taken as a warning that all accidents of whatever nature will be most closely investigated, and carelessness in any shape or form dealt with promptly.

The court is also of the opinion that the captain and officers of the ship are not responsible or to blame in any way for the accident.

(Signed.) O. G. V. SPAIN,
Wreck Commissioner.

We concur.

(Signed) ARCHIBALD REID,
Port Warden and Surveyor to Lloyd's Register.

(Signed) WILFROD GAUTHIER, Pilot,
Assessors.

MONTREAL, December 2, 1904.

SESSIONAL PAPER No. 21

SS. 'TURRET BAY'.

In the matter of an informal inquiry held at the Custom House, North Sydney, Cape Breton, on Wednesday, May 25, 1904, before Mr. Joseph MacPherson, Collector of Customs, into the circumstances attending the foundering of the British Steamship *Turret Bay*, on Friday, May 20, 1904, at St. Paul island in the Gulf of St. Lawrence, whereby a loss of thirteen lives ensued.

Report of the Court.

The *Turret Bay*, official No. 104245, port of registry, Newcastle, was a British steam screw ship, built of steel at Sunderland, in the year 1894.

The ss. *Turret Bay*, left Sydney, Cape Breton, laden with coal on May 19 at 9.30 p.m., bound for Montreal. The crew numbered 22 all told. At 3.50 a.m. on May 20, the ship ran into a heavy fog and was slowed down to half speed; at 4.10 a.m. speed was reduced to slow; at 8.15 the ship struck 'Paddy Rock' on the island of St. Paul. The engines were immediately put full steam astern and kept so for about ten minutes, when the vessel backed off into deep water. Orders were given for all hands to come on deck; the first mate was in charge at the time of the casualty. Immediately after the vessel backing into deep water the engine room and tunnel filled with water and she commenced sinking. The life boat was launched and 18 of the crew got into her, but owing to the high sea running the boat was forced against the side of the ship, breaking her stern, and then she capsized throwing everybody into the sea. Between twenty and thirty minutes from the time the vessel struck the rocks she sank in about forty fathoms of water. The whistle was kept blowing from the time the vessel struck until she sank by the lanyard being tied down. The St. Paul Fog-alarm was heard some time previous to the disaster, but was mistaken for a steamer's whistle. A small boat from the Island arrived upon the scene and after picking up five men and landing them, immediately returned, also the life boat at the Island arrived at the same time and picked up nine more men, three of whom were dead when taken into the boat and two more died after landing. The master, first and second mates, chief and second engineer, cook, steward and one sailor were not seen after the vessel sunk and are supposed to have gone down with her. The following are the names of the missing as near as can be ascertained:—

Hayden, master, of Limerick.
 McCarra, 1st mate, of Yarrow.
 Adam, W. H., chief engineer, of Huntley, Aberdeen.
 Matthews, 2nd engineer, of London.
 Johnson, boatswain.
 Hollfurst, able seaman, Sweden.
 Name unknown, cook.
 Brown, J., fireman, Sweden.

The undermentioned are dead:—

Gray, 2nd mate, of North Shields.
 Name unknown, steward, said to be from North Shields.
 Name unknown, donkeyman.
 Lyndericote, fireman, of Sweden.
 Harry Buck, messroom boy, of London.

The survivors attribute the loss of the ship to fog and to the fact that the fog signal was mistaken for another vessel's whistle. The names of the survivors are as follows:—

John W. Mason, 3rd engineer, Yarrow.
 Gustave Gustavsen, able seaman, Norway.
 J. Hacker, fireman, Germany.
 John Soderholm, fireman, Finland.
 C. Anderson, carpenter, Norway.

4-5 EDWARD VII., A. 1905

John G. Johnsen, able seaman, Sweden.
Jacob Tresmeden, able seaman, Sweden.
Jacob Kristernsen, fireman, Sweden.
John Nigguest, able seaman, Finland.

The above nine attested to the foregoing statement regarding the loss of the *Turret Bay*, on St. Paul island, on the morning of May 20, 1904.

Taken before me at my office this 25th day of May, 1904.

(Sgnd) JOS. MACPHERSON,
Collector of Customs, North Sydney, N.S.

OTTAWA, 1904.

SESSIONAL PAPER No. 21

APPENDIX No. 9.

OTTAWA, December 20, 1904.

To the Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit, herewith, a report from Superintendent Riley on the pilotage work between Montreal and Quebec, for the season of 1904.

I have the honour to be, sir,
Your obedient servant,

O. G. V. SPAIN,
Wreck Commissioner.

REPORT ON MONTREAL-QUEBEC PILOTAGE.

MONTREAL, December 19, 1904.

Commander O. G. V. SPAIN,
Wreck Commissioner,
Ottawa, Ont.,

SIR,—I have the honour to forward my report on my work as Superintendent of Pilots.

At the beginning of the season of navigation 1904, the Pilotage Service between Montreal and Quebec was taken from under the management of the Harbour Commissioners of Montreal and placed under the superintendence of Captain James J. Riley, who was instructed to report to the Department of Marine and Fisheries direct.

The business of the pilotage department is carried on at offices situated in the Boyer's Block, 223 Commissioners Street, with J. O. Michaud as assistant and A. L. de Martigny as stenographer. The Quebec office of this department was in charge of Ulric Thibaudeau, with offices in the building occupied by the Department of Marine and Fisheries at Quebec, until the cold weather set in, when an arrangement was made with Mr. Pederson, boatman, to give the officer in charge and the Montreal Branch Pilots the use of his room at the river front, the said room being properly warmed and having bunks, sofas and other conveniences. This arrangement was very beneficial to the pilots and to the service.

The number of branch pilots in active service at the beginning of the season was fifty-six; three were placed on the pension list, one was retired on account of defective vision, thus leaving fifty-two at present on the roll of active service.

The earnings of the branch pilots for this season amounts to \$71,013.73. The largest sum earned by any one pilot was \$2,366.30, and the smallest \$362.03. All the branch pilots except nine are employed on regular liners; these nine are called tour-de-role pilots and earned between them the sum of \$4,591.61.

The conduct of the Montreal branch pilots has generally been good and the number of complaints against them for inefficiency have been few. The pilot who was in charge of the *Vancouver* when she grounded in Lake St. Peter was convicted of an error of judgment and was retired from the service of the Dominion Line. The pilot who was in charge of the *Cape Breton* when she collided with the River Steamer Canada was freed from all blame. The pilot who was on the *Turret Chief* at the time of her strand-

4-5 EDWARD VII., A. 1905

ind at the foot of the Richelieu Rapids admitted defective eye-sight and was retired from the service until he could pass the necessary colour and vision tests. The pilot who was in charge of the *Catalone* at the time of her stranding off Longueuil was freed from all blame, it being shown that the steering gear of the vessel was defective. The charge made by the master of the *Bjoryrin* against the pilot of the *Tunisian* of having forced the *Bjoryrin* ashore at Pointe Citrouille was investigated and it was found that the accident was the result of misadventure and excessive care on the part of the pilots of both vessels. The pilot who was in charge of the *Campana* when she grounded in the Contrecoeur channel was acquitted of all blame. The Pilot who was in charge of the *Louisburg* when she stranded on the Gentilly shoals was found in default, fined sixty dollars, and was retired from the service of the Dominion Coal Company.

The only case of accident yet untried is the collision between the *Britannic* and a schooner off Louise basin, Quebec.

There is a complaint from the Harbour Commissioners of Quebec against the pilot of the *Oronion* for breach of the Quebec Harbour laws in anchoring his vessel off the entrance to the Louise basin. The investigation of this matter is postponed until the necessary witnesses can be examined.

Three tour-de-rôle pilots were tried by the Deputy Minister of Marine and Fisheries, for drunkenness, and are held under suspended sentence. One of the pilots of the Dominion Line was known to have been drunk and has been retired from the service of that line.

The number of apprentice pilots on the roll at the beginning of the season was forty-three, but as only thirty-one have passed the necessary vision and colour tests, the number at present on the roll is thirty-one, of which ten were selected under By-Law 6. It was required of these selected apprentice pilots that they should make at least two trips a week on regular liners during the season. This requirement has not been met in every case; the omission on the part of some is with reason, and on the part of others without reason.

That these young men should realize in fuller measure the importance of obedience to constituted authority is much to be desired, and measures are being taken to that end.

These ten selected are required, according to By-Law 8, 'to make a voyage before the mast to and from Europe during every winter season.'

The conduct of some of these young men leaves much to be desired.

The remainder of the apprentice pilots are variously employed, according to by-law 7, but I am not yet in possession of full information regarding the number of trips made by each of them.

It is important that each of these apprentices should serve at sea for, say two years, and I recommend that a by-law to that effect be passed and inserted in the By-Laws. This requirement will not work any hardship to the apprentice pilots, as there are many masters of vessels in the coasting trade who are willing to employ, at good wages, respectable young men as seamen, while at sea, and as helmsmen, while in the river.

The management of the Decayed Pilots' Fund was taken over by this department from the Harbour Commissioners of Montreal and the funds handed by them to the Receiver General on the 31st day of August last. The Harbour Commissioners of Montreal have made a report to the Department of Marine and Fisheries of their administration of this fund, and other matters connected with the Decayed Pilots' Fund, up to August 31. No change has taken place since then; the books are being kept in this office, and the moneys for the payment of pensions and other necessary disbursements are received from the Department of Finance.

I recommend that the office used by the Quebec pilots during the year 1903 be engaged for the season 1905, or that some other suitable location be provided for the Montreal branch pilots. The office that was in use during the season 1904 was too far from where the boatman, who takes the Montreal branch pilots to and from the vessels, keeps his boats.

All of which is respectfully submitted by your obedient servant,

JAMES J. RILEY,
Superintendent of Pilots.

APPENDIX No. 10.

REPORT ON MARINE SCHOOLS

OTTAWA, December 20, 1904.

To the Deputy Minister of Marine and Fisheries,
Ottawa.

During the winter 1902-03, a Marine School was established in the Monument National, at Montreal, through local enterprise.

The method of tuition and the success met were so gratifying that the government granted a subsidy of \$500, towards the maintenance of that school.

In that amount the professor's salary was included, also rent of room, lighting, heating and the supplies of various articles necessary for demonstration and instruction.

In 1903-04, the Honourable the Minister of Marine and Fisheries authorized the opening of four other schools at Halifax, St. John, Yarmouth and Victoria under the direct supervision of the department. The examiners at the above cities were appointed professors of those schools at a salary of \$250 per annum. A superintendent was also appointed at a similar salary, whose work was to prepare lectures and issue general instructions as to method of tuition.

A set of lectures was prepared and bound into book form and illustrated by means of enlarged diagrams.

The examination room was utilized as class room and supplied with a blackboard, 1 box of chalk, 25 chairs, 10 fathoms of rope, a guide for professor's use only, and a set of diagrams.

Thirty-two courses were to be delivered, but owing to lack of time in completing the lectures, the classes were only opened in January and closed at the end of March, at the opening of navigation, therefore allowing but 23 lectures to be given at the rate of two per week, lasting from $1\frac{1}{2}$ to 2 hours. The attendance was good and interest shown highly satisfactory,

The subjects taught were of an elementary nature principally on seamanship, navigational problems were in some instances lightly touched upon.

The professors were directed to discourse upon subjects which would interest the class of students in attendance.

In Montreal, the school opened in December, 1903, all through the winter 1904, 3 lectures were given weekly, a total of 35.

Annexed is a synopsis of attendance at those schools.

ATTENDANCE.

Schools.	Professors.	No. Lectures.	Min.	Max.	Average.	Total pupils.
Montreal	Capt. L. A. Demers	35	5	35	22	500
Halifax	Com. E. B. Tinling	21	8	31	12	338
St. John	Capt. R. C. Cole	23	2	21	9	229
Yarmouth	Capt. J. E. Murphy	23	3	16	9	203
Victoria	Capt. Jas. Gaudin	20	2	10	6	110

Subjects Taught at the Schools.

1. Explanations in the construction of wooden and iron ships, and names of parts of the hull.
2. On the launching of vessels, launching cradle and ways.
3. Description and demonstration of masts, yards, standing and running gear of a four masted ship.
4. Names of sails in square-rigged and fore-and-aft rigged vessels.
5. On parts of sails, gear attached thereto, and their effect, power and uses.
6. Description of parts of a steamer.
7. Details of mechanical appliances on board of ships, their uses and manner of working.
8. Explanations on the compass, its make, points, degrees and various corrections made to compensate for the various errors.
9. Practical illustrations and explanations on the hand and deep sea lead and line.
10. On log lines, mechanical or hand, and the method of calculating and measuring the length of knot.
11. A lecture on the barometer and thermometer and their utility in conjunction with each other.
12. Explanations on the various makes of thermometer, and the manner of converting degrees Centigrade and Reaumur into Fahrenheit, and *vice versa*.
13. Instruction in signalling, with flags, Semaphore and Morse systems.
14. Lecture on the method of resuscitating the apparently drowned.
15. Description of the mortar and rocket apparatus, and line of conduct to follow in the event of shipwreck.
16. How, and the best method, of using oil to prevent a vessel shipping seas.
17. Practical lessons on bends, hitches, knots, splices, sail sewing, cringles, mats, sennits, coach whipping, &c.
18. Explanations of the different parts of a sextant, its use and adjustments.
19. Lecture on the management of boats in a surf.
20. Of the equipment of life boats, in readiness for emergencies at sea.
21. Thorough explanations, with models, of the rule of the road.
22. Upon the lights and position of lights vessels are obliged to carry at sea and at anchor.
23. On storm and distress signals.
24. Paper read on contrivances used to determine the currents.
25. Names of the parts of an anchor, and the various kinds in use, kedges, sea anchors and chains.
26. Explanations of 344 sea terms.

SESSIONAL PAPER No. 21

27. Conversation upon the duties, etiquette, behaviour and discipline carried on on board ship.

28. Details of the vessels composing the Canadian fleet, their rigs, and the duties of each vessel.

29. Lighthouses, beacons and buoys, and the system of lighting.

30. Repetition of the above subjects condensed into 600 questions.

31. Method of carrying out an anchor in boats.

32. How to moor a ship. Tacking, wearing, boxhauling, clubhauling and turning a ship on her heel.

L. A. DEMERS.

APPENDIX No. II.

MARCONI WIRELESS TELEGRAPH SYSTEM.

To the Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit, herewith, the following report in connection with the Marconi stations erected in the river and gulf of St. Lawrence, during the present season.

These stations are situated at the following points :—

Fame Point, Quebec,
Heath Point, Anticosti,
Point Amour, Labrador,

Belle Isle, Quebec,
Cape Ray, Newfoundland,
Cape Race, Newfoundland,

They have all been working very successfully for some months before the close of navigation.

The station at Fame Point was finished on June 25th, and on that date held communication with the Allan Line R.M.S. *Parisian* outward bound. A large number of messages were exchanged between this vessel and the land station.

In the official test made by the government, communication was held 130 miles to the eastward and 101 miles to the westward. The latter distance might have been improved upon, but it was deemed inexpedient to continue the test owing to the fact that the government steamer conducting the same was ordered elsewhere.

The Heath Point station was completed on July 21, and on that date held communication with royal mail steamers inward bound, for periods of six hours. The official test of this station showed it to have an efficient range of about 130 miles, but on several occasions it has held vessels even further.

The Point Amour station was completed on August 10, and on August 11 had its first communication with an outward bound steamer. This station in the official test made by one of the government steamers showed a range of 115 miles.

The Belle Isle station which was completed on September 1, has also shown by its official test that it is fully up to the standard of the other stations. It was in constant communication with the Point Amour station which is situated some 66 miles to the westward, from the time it was opened until the close of navigation.

The station at Cape Ray, Newfoundland, was completed on October 7. The official test of this station showed it to be entirely satisfactory, having an efficient range of about 100 miles.

The Cape Race station was completed on November 17, and the official test of this station was also most satisfactory. The range of communication was fully up to that of the Cape Ray station.

Both the Cape Ray and Cape Race stations were utilized by the late Governor General to send messages to the government and people of Canada on the occasion of his departure by the R.M.S. *Parisian*. The Cape Race station was also made use of by the Dominion government to communicate with the present Governor General upon the occasion of his coming to Canada by the same steamer.

All of the above stations have reported shipping and shipping intelligence to Lloyd's agent, at Quebec.

The Belle Isle and Point Amour stations have proved exceptionally valuable in communicating to steamers coming through the straits of Belle Isle news as to weather conditions prevailing in the straits.

SESSIONAL PAPER No. 21

In many instances vessels have been in communication with shore stations when enveloped in thick fog, and have found the Marconi system an invaluable supplementary aid to the fog signal service already existing.

News of current events have been furnished by the stations to all vessels equipped with the Marconi apparatus. This has not only proved a boon to the passengers, but will undoubtedly tend to popularize the St. Lawrence route with the travelling public.

The important aid to navigation rendered by the Dominion of Canada in the matter of wireless telegraphy, has been very greatly appreciated by the Shipping Federation of Canada and the shipping interests generally.

Stations at Sable island and on the mainland, probably in the neighbourhood of Canso, which are to be built under contract, will be commenced as soon as the weather conditions permit.

It was not intended in the first place to have these stations intercommunicate, but it has been pointed out by ship owners that the value of the system to shipping generally would be enormously increased if these stations were able to establish intercommunication. For this reason the government has decided to increase the power of the St. Lawrence stations and to establish two other stations so that communication may be had by means of the Marconi system from Fame Point to Belle Isle or Cape Ray.

The enormous advantage which will follow from having this system of intercommunication will be better understood when it is known that the captain of a steamer will be able to know just what weather conditions prevail along the entire St. Lawrence a few hours after leaving Quebec, and can direct his course accordingly,

Three government ships, the *Canada*, *Minto* and *Stanley*, are fitted with the Marconi apparatus.

I have the honour to be, sir,

Your obedient servant,

O. G. V. SPAIN,
Commander Canadian Marine Service.

OTTAWA, December 12, 1904.

APPENDIX No. 12

PRELIMINARY REPORT ON THE DOMINION GOVERNMENT EXPEDITION IN THE SS. *NEPTUNE* TO HUDSON BAY AND THE NORTHWARD.

To Lt.-Col. F. GOURDEAU,
Deputy Minister,
Department of Marine and Fisheries,
Ottawa.

SIR,—In accordance with your instructions, I left Ottawa on the 21st of July, 1903, to superintend the necessary alterations to the steam sealer *Neptune*; and to provision her, for an eighteen months' cruise, in Arctic waters.

The *Neptune* is the largest and best of the sealing steamers of the Newfoundland fleet; and belongs to Job Bros. & Co. Built in 1876, but always kept in good repair, she is at present quite sound in hull and machinery.

A telegram, accepting the offer of the firm to charter this ship, was sent from Ottawa on the 11th of July; and the ship was immediately placed in drydock at St. John, where a few small repairs were made to her under-body, after which, she was speedily sent to Halifax, arriving there on the 20th.

As the *Neptune* was in the state, in which she had returned from the Spring sealing voyage, a large amount of work was necessary to clean and fit her, in a short time, with the accommodations required by a large crew; who were to pass the next eighteen months on board, in an Arctic climate. At the same time, provisions, outfit and equipment for this long cruise were purchased, and delivered in Halifax; and all was ready for a start, on the 22nd of August, one month from the time of my arrival in Halifax.

During the interval, I had the honour receive a commission appointing me to the command of the expedition on board the *Neptune*.

On leaving Halifax, the officers, crew and passengers, on board the *Neptune* were forty-two persons; the officers and crew numbering thirty-four; to which was added a detachment of N. W. Mounted Police, consisting of an officer, non-commissioned officer and four constables; there was also an assistant geologist and a naturalist.

The ship was loaded, to the hatches, with coal and provisions; and a heavy deck-load of lumber and fresh provisions hampered the working of the vessel, and rendered great caution necessary in heavy weather.

Halifax harbour was left, on the morning of the 23rd of August; and the course laid eastward, along the coast of Nova Scotia. On the morning of the 25th, a strong westerly wind forced us to take a shelter behind St. Paul island; where we remained until next morning, when, crossing to the west coast of Newfoundland, its shore was followed to the Strait of Belle Isle; and Forteau Light was passed at 7 o'clock on the evening of the 27th, where we signalled our last farewell to civilization. On the 28th we arrived at Dominoe Harbour, and sent a boat ashore to procure a supply of salted codfish; owing to the bad weather experienced here all summer, no fish could be obtained.

Favoured by a very fine weather, the ship soon passed northward along the coast of Labrador, with its grand, wild scenery and icebergs; and on the 31st, Nachvak bay was reached; where a stop was made to procure sealskin boots, fill the water tanks and inquire for an Eskimo interpreter; we found that we could get the latter at Port Burwell, so steamed out at the bay for that place in the evening. Port Burwell was reached on the afternoon of the 1st of September; and a landing was made by Commissioner Moodie; who explained to the master of the small trading post there, the

SESSIONAL PAPER No. 21

intentions of the government, in regard to the enforcement of the Laws and Customs Regulations. Henry Ford, who acted as Eskimo interpreter on the *Diana*, was engaged in the same capacity, for the *Neptune*.

Port Burwell was left early next morning; and we soon ran into fog, off the Button islands; it was accompanied by a strong S. E. wind, so, in the afternoon the speed was reduced to slow, as the dangerous reefs off Monumental and Franklin islands were not far away. We passed without seeing them; and the next day, steamed slowly into Cumberland Gulf, without a sight of the land. On the 4th, land was sighted, for a short time in the morning, and again in the afternoon: towards evening the fog lifted sufficiently, to allow the ship, to approach the shore, and to anchor in a large harbour; which was afterwards found to be on the south side of the gulf, about twenty miles to the eastward of Blacklead island. The fog lifted at 11 a. m. next day, when we got under way; and coasting slowly westward, reaching the settlement of Blacklead that evening.

The settlement, consisting of some dozen small buildings, is situated on a high, barren, rocky island, about five miles from the mainland. There is a fairly safe anchorage protected by reefs, in a small bay, at the south-east end. The settlement consists of a small whaling and trading post, belonging to Noble Bros., of Dundee, Scotland; and is the headquarters of the Church Mission Society, on Cumberland gulf.

The whale fishery is carried on at Cumberland gulf, in whale boats manned by Eskimos, who are employed by the whalers for that purpose, at Blacklead and Kikkerton stations. Each boat has a crew of five natives. The fishery starts about the 1st of October; and continues until the gulf freezes solid, generally in December. It is renewed again, as soon as the ice begins to move; which is usually in February, or the beginning of March. The fishery is not very profitable, as whales are not taken every year. Happily for the natives, two whales were captured in the spring of 1903; and later 3,000 seals were killed; this has put new life into the trade and has prevented the abandonment of the station: which had been seriously contemplated. There are about 450 persons, of Eskimo blood, living about Cumberland gulf; and all are more or less dependent, on the whaling stations, for a living; so were the stations abandoned, there would be great hardship among them: and a number would probably perish if outside help were not afforded.

Two rivers, on the north side of the gulf, and one at its head, are well-stocked with Arctic salmon; no efforts have been made, to fish these streams, for the market; but there is little doubt that a successful fishery could be made there; and in case of total failure of the whale fishery, the natives might find employment in the manner: or, in securing white whales, which are abundant in a river on the south side of the gulf, near its head.

There is a small church, hospital and parsonage at Blacklead, where the Rev. M. Peck and two assistants are doing good work among the natives.

When we visited the stations, all the able bodied males were away hunting barren-ground caribou, on the mainland. They leave about the middle of July, and return late in September; going with their boats, far inland, to the vicinity of Nettiing lake, where the deer are very numerous.

On our arrival at Blacklead, a visit was immediately made to the station; where Commissioner Moodie explained the nature of our trip, and stated the intentions of the government.

We left again that evening, having taken on board a native pilot for Kikkerton. We reached that place, at noon, on the following day; and only remained there long enough to explain our mission; when we steamed back to Blacklead. Kikkerton is very similar to Blacklead, being a cluster of small buildings nestled, at the foot of a rocky hill, on an island, one of a small group forming the harbour; and situated about ten miles from the north shore of the gulf.

At Blacklead, we took on board Capt. Jackson and his boat's crew of natives; they were bound for Cape Haven; and acted as pilots in payment for their passage. We steamed all night and next day, along the south shore of Cumberland gulf, in exceedingly fine weather. This is a very bold, broken coast, with bare, rocky cliffs, that rise

4-5 EDWARD VII., A. 1905

from 500 to 1,000 feet above the sea ; while immediately behind, the land rises in broken hills, to altitudes, varying from 1,000 to 2,500 feet ; and is covered by many large patches of snow. The coast is deeply indented by long, narrow fiords ; and the mainland is usually masked, by clusters of bold rocky islands, behind which, a boat channel may be followed, almost all the way, from Blacklead to Cape Haven.

The wind was fresh when we arrived at Cape Haven, and our pilots did not think it safe to enter the harbour of the station, surrounded, as it is, by shoals and reefs ; so we stood across Cyrus Field bay, to a small harbour, in its south-west corner, called Frenchman's cove. We arrived at the mouth of the cove just at dark ; and found its entrance blocked by a huge iceberg ; a boat was lowered and discovered a deep narrow channel, between the iceberg and the rocks ; as the water was too deep to anchor outside we attempted the passage, by the light of a gastly moon ; and, after some anxious minutes, got safely into a snug land-locked harbour. The early part of the morning of the 8th, was spent in getting on board some casks of oil ; which had been purchased at Blacklead, from the owner of the station. On landing, the station was found to consist of two very small buildings, perched on a narrow ledge of bare rock, almost overhanging the water of an inner harbour and surrounded by desolate ragged hills ; all presenting a most lonely and forlorn appearance. This station has been abandoned as unprofitable.

Leaving Frenchman's cove, with a fresh west wind, we crossed the bay ; and arrived at Cape Haven station, early in the afternoon. The boats were at once sent ashore, to bring off a steam launch also purchased from the former owner of the station. Cape Haven station is situated on a rocky island, about a mile south of the cape. The station consists of three small buildings, all very neat and clean, and is the property of Messrs. Potter and Brown, of Boston, Mass. It was established for the whale fishery, but, only three whales have been killed here, in the past twelve years, and the catch is confined to walrus, big seal and white bear ; the catch for 1902-03 being : 27 walrus, 30 big seal and 28 bears ; and the business is unprofitable. There are about one hundred natives attached to the place ; mustering enough able-bodied men to man five whale boats. No other natives are found, between here and Icy cove, on the north side of Hudson strait.

The north side of Cyrus Field bay is very shallow and lumpy ; and the land is low and broken into points and islands. On this account, the approach to the station is very risky with a large ship ; and I doubt if the Customs dues to be collected there, warrant the risk taken in visiting the place. Not only is the near approach dangerous, but many miles outside, a line of icebergs stretch for upwards of 20 miles to the northward of Monumental and Franklin islands, showing shallow water there also.

We left Cape Haven at 5 p. m., and passing inside the line of icebergs mentioned, were off Hall Island, at the north point of Frobisher bay, at 8.30 p. m., and with a fine night, continued across that bay and past Cape Best on Resolution island, next morning at seven o'clock and so entered Hudson strait.

Following the north side of the strait, we passed during the day, the Grinnell glacier which is situated just beyond the southern slope of Baffinland, and discharges into Frobisher bay. In the evening we passed close to the Saddle-back islands, and found them to be double the number marked on the chart ; we also passed over the doubtful Griper shoal, without any indication of its presence. Over fifty icebergs were seen along the north side of the strait, and from the Saddle-backs eighteen were counted at one time. The south-east winds reported to have prevailed all summer on the Labrador coast, had driven the bergs into the strait, to beyond Big island.

During the night, we passed Big island, and in the morning of the 10th, were about 25 miles off Douglas harbour ; the highlands of the south shore were gradually approached, so as to pass, within a short distance of Cape Weggs ; after which the course was shaped for the east end of Charles island, and its north side closely followed to its western end.

Near the western end of Charles island, are a few small islands ; about which a great many walrus were observed. As a number of these animals were required for dog food, during the coming winter, the ship anchored for the night in a small harbour behind one of the islands, and next morning we started to hunt for walrus in the small

SESSIONAL PAPER No. 21

steam launch, and it proved very exciting sport. Several hundred of these animals were swimming about, usually in bands of ten or a dozen; a band would be singled out and chased by the launch at full speed. When the hunt started, the walrus would swim long distances under water, and would only come to the surface a few seconds to breathe; as the chase became hotter the length of the dives became shorter and shorter, until finally, the animals were almost continuously above water, and their pace slackened, so that the launch could be forced almost on top of them, and the whale spear attached to a water keg by a line, was plunged into the back of one. The boat was then put full speed astern, and a fusilade opened, to prevent the wounded animals from attacking the boat: notwithstanding this heavy fire, they would endeavour to get their tusk over the side of the launch, and at such times the sport was exciting. We succeeded in capturing seven, and lost fully as many more. When the carcasses were hoisted aboard they almost filled the after deck.

In the evening the ship was headed for Cape Wolstenholme, where we arrived early next morning, and ran into Erik cove, a good harbour, just east of the cape, with a small river flowing in at its head, very convenient for filling our tanks. While the crew were engaged at this work, the hunters succeeded in killing two polar bear on the cliffs about the harbour; one of them being found in a hole in a large bank of snow.

A strong south wind was blowing in the afternoon, accompanied by heavy squalls of snow, so it was thought advisable to stay in the harbour for the night. The weather continued dirty next morning, but clearing somewhat towards noon, we got under way, and steamed slowly across the western entrance of the strait, between Salisbury and Coats islands, in order to observe the state of the ice in Fox channel.

On the morning of the 14th, we came up with loose ice, about ten miles from Cape Leyson, the southern point of Bell island, and steamed through it, to the neighbourhood of Seahorse point, which was reached at noon. I landed there in the small steam launch; at the same time sending the ship into the heavy ice beyond the point; this ice was found to be in large sheets, and Captain Bartlett did not think it wise to go far into it so late in the season.

We landed just south of the point, and found it to be composed of low hills of granite, we then coasted a few miles southward and again landed, this time on a low flat shore of broken, light-bluff coloured limestone, thrown into low ridges, each a little higher than the one outside. The limestone was quite loose and without a sign of vegetation upon it; the country being the most desolated looking I have ever seen. A few traces of Eskimo were found here but they were very old.

On our return to the ship, a great number of walrus were seen upon the pans of ice; two boats sent after them, succeeded in killing four; they were hoisted aboard to complete our supply of dog food.

That night we lay to among the loose ice. In the morning, thousands of walrus were seen asleep upon the ice, and were left undisturbed. The ship was off Cape Leyson at 7 a. m., where the ice was parted from, and seen no more on this part of the voyage.

Keeping sight of the low southern shore of Bell island, we steamed westward through Evan's strait; taking frequent soundings on the way; and finding the bottom very even, with plenty of water. We passed close to Walrus island, in Fisher strait, and continued westward during the night, taking soundings every hour, as the weather was very thick with snow flurries; this weather continued all next day, and during it, we passed over the location of Tom island on the chart, without any indications of it from the soundings.

The weather moderated on the morning of the 17th, but the fog continued; at nine o'clock breakers were sighted, and shortly after a number of low islands were passed. The launch was lowered, and the ship slowly followed it into a fine harbour, behind islands, in the mouth of a long bay.

We were exceedingly lucky in reaching a good harbour, ahead of a heavy gale from the northeast, which lasted until the 22nd. Not knowing our exact location, the large launch was made ready for an exploration of the coast, to find, if possible, some of the natives, and also to search for the wintering quarters of the American whaling schooner known to be in this part of the bay. While engaged in preparing

4-5 EDWARD VII., A. 1905

the launch, we were agreeably surprised to see a party of natives on the hills to the eastward. The launch was sent away in the gale, and after considerable difficulty returned with them to the ship.

They proved to be a number of Eskimo, from Cape Fullerton, on their way, to hunt deer inland, from the head of Winchester inlet; at the mouth of which we were anchored. They informed us, that the schooner *Era* was already in winter-quarters, at Cape Fullerton; and a couple of them were easily persuaded to pilot the ship to that place, where a good harbour would be found to pass the winter in. We also learned, that the natives, on the coast, had very few deer-skins; and that, only by visiting the Eskimo of Chesterfield inlet, could a sufficient supply be obtained to provide winter clothing for the crew. At the same time a supply of fresh meat could also be procured; and arrangements made with the natives there, to bring in further supplies, during the winter.

Under the circumstances, I thought this visit a necessity; and, having a native guide, proceeded to outfit the large launch, for a five hundred mile trip, to the head of Chesterfield inlet and return. Everything being ready, and the gale having abated, we steamed out of Winchester inlet, early in the morning of the 23rd, closely followed by the *Neptune* en route to Cape Fullerton; where she arrived that evening. There was a heavy sea, crossing to the mouth of Chesterfield inlet, but the launch behaved beautifully; and at noon, we were in the smooth water of the inlet. In crossing, we kept outside a wide fringe, of low rocky islands; and often passed over shoals far from the land, especially on the north side, of the mouth of the inlet, where the reefs extend several miles seaward. That night, we anchored behind a small island, on the north side, fifty miles above its mouth and eighty-five miles from Winchester Inlet.

Starting at daybreak next morning, we arrived at 8.30 a. m., at an encampment of eight tents of Eskimos, situated on the shore of a large bay, a few miles below Ragged point. The men were away hunting, but, we learned from the women, that a boat loaded with skins, had left three days before for the *Era*, at Cape Fullerton; and consequently not many skins could be procured here. After a short stay at the camp, we continued on, and in the evening arrived at a second encampment, situated on the south channel of the river, leading from Baker lake, past the Howell islands, and one hundred and twenty miles above the mouth of the inlet. The men of this party were also away; but returned before night; and we purchased, from them, upwards of seventy skins, and about 400 lbs. of meat. There had been a great slaughter of deer at the encampment, some time in August, as hundreds of half cleaned skeletons were lying about the camp, the horns of which were in the velvet.

We started on our return journey, at sunrise next morning; and rushed down stream, aided by a current of six miles an hour. A stop was made at the lower encampment; where, finding that the men had not returned, we determined to await them until next day. They returned, in two boats, the following morning, about 11 o'clock; a number of deerskins were added to our stock, together with a considerable amount of fresh meat; and they promised to visit the ship, during the winter, bringing further supplies of meat. As soon as the trading was finished, we continued down the inlet, until it became too dark, for the pilot to keep his bearings; then we worked slowly inshore, and came to anchor among the islands and shoals of Dangerous point.

Near midnight, the launch grounded, about an hour before low water; and before anything could be done to stop her, had fallen down on her side and partly filled with water. Efforts were immediately made to lighten the launch, by sending loads, in the dingy to a nearby island; and by dumping the coal overboard. The water was bailed out, as the tide fell; but our efforts were fruitless as the rising tide flowed in over the side; and we had to confine ourselves to saving, what we could, before the water rose above the launch; the rest of the night was spent in moving the cargo above high water mark on the island; and day dawned, on a rather forlorn party, stranded on a small barren island; and looking out, to the spot, where, we knew that the launch lay sunk. With the next falling tide, an endeavour was made to right the launch, with a tackle, made with a boat mast and the blocks of the boat sail; this proved too light for the work; and we had to reluctantly abandon the hope of saving the launch, without outside help.

SESSIONAL PAPER No. 21

All the necessary articles saved were sent, in the dingy, to a small cove on the mainland ; and this work took until after dark ; when I sent Wells, Ford and Scotty, the Eskimo pilot, with instructions to reach the *Neptune* as soon as possible, without taking too great risks. They left in the fourteen foot dingy, on rather a perilous trip, considering the late season of the year. The four of us remaining, made ourselves as comfortable as possible, under the circumstances ; and resigned ourselves to await the arrival of the *Neptune*.

On the afternoon of October 3, we were gladdened by the smoke of the steamer ; and later saw her come to anchor about ten miles below the camp. The men in the boat had made a wonderful trip, considering the bad weather encountered, in so small a boat ; and reached the ship on the morning of the 1st. Steam was immediately raised ; and the ship started for Chesterfield inlet. To show the danger of this unchartered coast, the ship grounded twice, out of sight of land, to the northward of the mouth of the inlet ; and several times got into very, shallow water, without knowing, which way to go for deeper ; fortunately no damage was done by her contact with the bottom.

On the morning of the 4th, three of the ship's boats arrived at the camp, accompanied by the whaleboat of Captain Comer ; who had kindly volunteered his services at Cape Fullerton. An attempt was made to raise and float the launch ; but it was only partly successful, owing to a gale springing up. Late in the afternoon, I accompanied Captain Bartlett, in an attempt to return to the ship ; but we were unable to reach it ; and had to spend the night, with the boat's crew, under the lee of a rock, on a small island, in a raging snowstorm, and did not reach the ship untill noon next day, all tired, wet and hungry.

The gale lasted until the 8th, when the ship went up the inlet, and anchored close to the launch ; which was raised ; and on being hoisted on board, was found to have large holes in both sides.

As soon as the launch was secured, the ship stood down the inlet ; and anchored, a few miles inside its mouth, awaiting daylight to pass over the shallows outside. These were avoided by keeping more to the southward, until a considerable distance off the coast ; when the course was shaped for Cape Fullerton ; and the anchor dropped inside that harbour at dark.

Before the ship left for Chesterfield inlet, Commissioner Moodie, had decided to erect his post at Cape Fullerton ; and considerable work had been done on his house. This work was continued on our return ; and other preparations were made for wintering here. The first was the cutting and piling of a supply of ice, for the winter's water ; the ice was obtained from a small pond, close to the post, and about half a mile from the ship. The ship was next decked over with rough lumber, so as to keep the snow and wind out of the living quarters. The harbour froze over on October 16, and a few days later the ship was swung, so as to head true north.

By the beginning of November, the days became very short ; and to take advantage of all the daylight, the midday meal was dispensed with, giving us a late breakfast and an early dinner, with an informal supper late in the evening. This order continued until March 21.

As soon as the ice about the ship became thick enough, the work of banking the sides of the vessel was commenced, and it was completed in a few days. A wall of snow blocks, about two feet thick, reached as high as the bridge deck, completely around the ship. Sails were spread over the temporary roof, and were covered with snow ; this raised the temperature on the deck several degrees and cut off all draughts, adding greatly to our inclosed space and comfort.

The short days of the winter months passed quickly ; sufficient work being found to keep all busy during the daylight ; and the monotony of the long evenings was relieved by games, readings, a weekly lecture on Wednesday and a dance on Thursday. Another weekly dance was given on board the *Era* on Saturday evenings. The principal work was hauling ice for water, and keeping the ship clear of snow, while the leisure daylight was spent in hunting, or visiting fox traps.

About the middle of November, I sent ashore, and had stored in a shed, a quantity of provisions and outfit sufficient to keep the ship's company until spring ; this was done in case of fire ; and for the same reason, water holes were kept open, along side ; and a

4-5 EDWARD VII., A. 1905

force pump and hose kept in readiness, in the stoke hold, where water could be obtained from the sea cocks.

Thanksgiving Day was observed on November 12 by morning service and an extra good dinner and dance in the evening.

On December 7, a couple of natives arrived at the ship; and Major Moodie soon after arranged with them, to take a mail to Churchill. We were all busy with our correspondence, for a week, the mail leaving Fullerton, December 13. The men were accompanied to Chesterfield, by one of our natives; and it was not, until the first week of July, that we learned from people from that neighbourhood, that for some reason, the mail carriers had not got beyond Baker lake; and that the mail was there.

Christmas and New Years were passed as pleasantly as possible; and after the holidays, regular work was resumed; but the short, very cold days of January and February, did not allow of much work. With the longer days of March, the wrecked launch was repaired; and an ice-boring machine made. At the end of March, preparations were begun for Spring work.

Early in April, Mr. Caldwell left the ship, in company with three natives, to explore the country between there and Wager inlet. He was absent until May 30, during which time, he made an excellent sketch of the shore line, from Cape Fullerton to, and around Wager inlet; a very creditable trip considering the difficulties he had to contend with.

Mr. King, assisted by Mr. Ross, made surveys of the harbour and approaches to Fullerton, taking a large number of soundings, by the aid of the ice-boring machine, made by Mr. Crossman, chief engineer. Unfortunately the machine was lost by the breaking up of the ice, before the work was completed.

Owing to sad circumstances, to be mentioned presently, I was unable to leave the ship until the first week in May; when I made a survey of the coast, between Fullerton and Chesterfield inlet; and examined it geologically. I was absent ten days.

Early in the month, the temporary covering was removed from the forward deck; and on the 30th, the remainder was taken down, and sent ashore, for the use of the detachment of North-west Mounted Police; who had previously been supplied with provisions and coal.

Daylight was continuous from June 1; and the long days were employed cleaning, repairing and painting the ship and boats for the summer's cruise; everything being practically ready by the end of the month.

On June 15, accompanied by Dr. Borden, two of the crew and three natives, I left the ship, with two whale boats, kindly furnished me by Captain Comer, for a trip to Southampton island in company with his four boats. We followed the coast northward to Whale point; and then crossed, through leads in the ice, reaching the island some fifteen miles north of our starting point. Parting with Captain Comer, we examined about fifty miles of coast, to the northwards of Cape Kendall; and remained there a week, returning, through the ice, to the ship, on July 3. We visited the island too early for the best results, as the coast was covered with solid ice; which extended from one to six miles from the land. This ice and much of the land, was covered with deep snow; which rendered travelling next to impossible. I took formal possession of the island; hoisted the Dominion Flag; and left a record of the proceedings, in a conspicuous cairn. We collected a number of fossils, bird skins and a few eggs, being too early for the last, and for plants.

There was little change in the state of the ice, on my return; ashes, spread on the ice had cut deeply into it; and this was continued into the channel to the Beacon. The ice about the ship was sawn, so, as to allow her to swing, for the adjustment of the compasses; and the work proved so difficult, that the attempt to saw out the channel was abandoned, as it was so slow a process, that I felt sure we would be released by nature, long before a channel could be sawn to open water.

It is my sad duty to record the death of two members of the expedition, Dr. G. B. Faribault, Assistant Surgeon, and Jas. O'Connell, boy. These sad deaths were not due to physical illness, but to mental troubles. Dr. Faribault, previous to joining the expedition, had a serious attack; and had been treated for nervous disorders. During the first month of the trip, he was seemingly stupid, but not visibly insane. Signs of

SESSIONAL PAPER No. 21

insanity developed in him, towards the beginning of October; and November 1, he became violently insane. On the 3rd, his actions became so violent and dangerous, that by the advice of Dr. Borden, he was handed over to Major Moodie, as a dangerous lunatic. Preparations were immediately made for securing him, under a guard of the North-west Mounted Police; and a cell and guardroom were erected in the port alley-way for that purpose. He continued noisy and violent, with a little change in his physical conditions, until March 22; when, he was taken with severe convulsions, lasting over several days. These exhausted his strength; and he gradually sank, from that time, until his death, on April 27. Dr. Borden made a *post mortem* examination; and pronounced death due to chronic inflammation of the brain. We buried him, with all the honour possible, on an island of the harbour; and later erected a cross with a brass inscription, at the head of his grave.

Thanks are due to the members of the North-west Mounted Police, for the patient and careful treatment of Dr. Faribault, during his long illness; and his death was not only a happy release to himself, but to everybody on the ship; as his ravings, heard throughout the ship, constantly reminded all of his presence; and were anything but cheerful during the long winter nights.

Young O'Connell, a boy engaged on the recommendation of Mr. Roche, in Halifax, early developed signs of a mild form of lunacy; but was in no ways dangerous. I had personally warned him on several occasions, not to leave the ship, without a companion; but as he had a habit of hiding himself behind boats, or on the top of the house, no track could be kept of him. Early on the evening of December 11, he was observed leaving the ship to go to the *Era*, or snowhouses not far away. Later, a strong wind and snowstorm came on; but owing to his habits, O'Connell was not missed, by his mess mates, until the following morning. An immediate search was made for him, by the united crews and natives of the ships; but, owing to the raging storm, it was ineffectual, until the 15th; when, the weather clearing, one of the natives discovered traces of him; and followed the tracks to the open water, where they ended. The poor fellow appears to have wandered about, until the storm commenced; when he went directly ahead of the wind, until he reached the open water; and was quickly drowned. No signs of his body were afterwards seen. There is no doubt that his death was quite accidental.

Apart from these two sad cases, the general health was excellent; and there were no serious illnesses on board. On the *Era*, four cases of scurvy occurred; two of these slight, the others severe; one resulting in death, and the other being so bad as to cause the discharge of the seaman, whom we sent by the relief ship to St. Johns, to the care of the United States Consul.

The weather, as will be seen from the summary below, was at times quite severe; and work on deck, in consequence, was then impossible; but even during the coldest spells, the living quarters were always warm, dry and comfortable; a circumstance to which, in a large measure, the general good health may be ascribed.

Month.	SUMMARY OF TEMPERATURES.		
	Average Temp.	Highest.	Lowest.
1903.			
September.....	36.15	56°.3	22°
October.....	17.166	39°	—8°.5
November.....	5°.53	32°	—20°
December.....	—8°.143	15°	—37°
1904.			
January.....	—22°.4	12°	—42°
February.....	—27°.8	7°	—46°
March.....	—20°.6	5°	—53°
April.....	5.77	30°	—30°
May.....	19°.8	40°	—7°
June.....	36.26	63°	20°

The ice, in Fullerton harbour, and its approaches, gave no sign of breaking up, until about the middle of July ; when, that outside the harbour began to decay ; and was broken by the spring tides. The western channel remaining closed, a line of soundings was run out of the small eastern channel ; and a passage, crooked and narrow, was found there.

At 2 a.m., Monday, the 18th July, we cast our lines from the ice ; and breaking the harbour ice, we passed out into open water. Cautiously sounding, as we steamed slowly out, it was six o'clock, before we reached moderately deep water, beyond the reefs, and almost out of sight of land.

There was very little floating ice outside ; and a course was laid, for the southwest end of Southampton island ; which is placed at least forty miles too far south, on the charts. Continuing through stringers of loose ice, by noon of the 19th, we were in the middle of Fisher strait ; and skirting along the low shores of Coats island. In the evening we passed a conspicuous headland, forming the northeast point of Coats island ; and which I named Cape Préfontaine.

Leaving Coats island much heavy ice, in large sheets, was encountered ; and the ship was forced, far to the southward, in crossing from there to Mansfield island ; which was sighted at 9 a.m. of the 30th. We passed within a few miles of its low shores, to its northeast point ; and then crossed directly to Digges island ; where we arrived at 6 p.m., having to pass through heavy ice, all the way across.

Hudson strait to the eastward of Digges, appeared blocked with ice ; and so, after an attempt, to find a passage through it, to the northward, we returned south ; and were finally beset at 4 a.m. on the 21st, near the eastern end of Digges, and about three miles from that island. The ship remained fast in the ice, until 8 p.m. on the 22nd ; when, a slight slackening of the ice, allowed us to force our way into open water, under the land. During our confinement in the ice, the ship drifted fully thirty miles to the eastward, along the south coast of the strait.

A good lead of open water, from one to five miles wide, continued along the land, to beyond Deception bay, where the ice came closer to the shore, and the water became too shallow, to permit us, to attempt a farther passage ; so a stop was made by forcing the ship into the ice at 6 a.m. on the 23rd. The ice slackened later ; and before night, a way had been forced, to the east end of Charles island ; where the ice again closed and the weather became thick. We remained in the drifting pack, until 10.30 a.m. next day ; having drifted, during the interval, eastward, to Douglas harbour. By one o'clock, we reached open water, to the northward ; and turning eastward, met with no more heavy ice, on the passage to Port Burwell ; where we arrived, at 5.30 p.m., on the 25th July ; just an hour after the arrival of the *Erik* with supplies from Halifax, on the very day agreed to the year previous.

The supplies of coal and provisions were all received from the *Erik* ; those for the Mounted Police, were landed at Port Burwell, by request of Major Moodie, who returned home on the *Erik*. This work was completed on the 1st August ; and early the following morning we left on our Northern cruise.

The course was N. E. true ; and we were at noon, twenty miles off Cape Resolution ; where much snow was seen on the land. A considerable number of icebergs were passed during the afternoon and evening.

The weather remained clear until the afternoon, when fog settled down. Only one iceberg was seen in the morning, and none again until late in the afternoon, when a few small ones were passed ; and at six o'clock we came up to a scattered pans of heavy field ice. These were supposed to be outliers of the western pack ; and the course was changed to the eastward to avoid entering the ice. During the morning a school of six killer whales played about the ship for some time.

The weather remained foggy, from the afternoon of the 3rd until that of the 6th. During this time the ship could only go slow, on account of the danger from icebergs hidden in the fog. When the fog lifted, it disclosed the wild and picturesque scenery of the western side, of the great island of Disco, with its snow capped mountains rising 4,000 feet above the sea, and with great glaciers filling its valleys. Two large Right whales were seen, close to the ship, during the fog, on the 5th.

SESSIONAL PAPER No. 21

We steamed up the Greenland coast, or rather from twenty to fifty miles off that land, until we reached the Duck islands, on the evening of the 7th; when the course was changed, to the westward to cross Melville bay to Cape York, and to so gain the 'North Water' of the whalers. A good many icebergs were seen along the northern Greenland coast; and there were large masses of field ice inshore, evidently but lately floated out of the deep bays along the coast.

Our passage across Melville bay was made in very dirty weather, with fog, heavy rain and a strong southeast wind, but luckily no ice, beyond a few bergs, was met with, until within a few miles of Cape York, where the weather cleared sufficiently to make out the land. We ran along the margin of broken ice, which extended from one to four miles from the rocky shores, and at eight o'clock in the evening, reached Conical island, and rounded into the snug harbour of Parker Snow bay. The daylight was now continuous, and the only difference between night and day was the greater cold of the former.

We were very glad to find such a good anchorage, as on the 9th the wind blew a gale of fifty miles an hour, cutting the tops of the waves, and rendering a landing impossible until it dropped in the evening, when I went ashore and examined the glaciers flowing from the ice cap down into the valley of the bay. We climbed about 1,000 feet to a rocky hill dividing the stream of ice, and found the rocks to be granites and gneisses, very similar to our Laurentian rocks. The higher hills rise about 1,500 feet above the sea, and behind them, the front of the ice-cap is about 500 feet higher.

On our return to the ship, we got under way, and at midnight passed the great Petiwak Glacier, with the midnight sun shining brightly upon it and upon the numerous icebergs broken from it.

The 10th was fine and calm. At eight o'clock in the morning we passed Cape Parry, and crossed from there between Northampton and Herbert islands, to the north side of Inglefield gulf. The upper part of this great bay, was still frozen solid, while the mouth was partly filled with pans of ice, on which were a number of walrus and big seals. The coast was then closely followed northward, past Cape Alexander, at the mouth of Smith sound. Many icebergs were seen, but no field ice until the cape was passed. At eight in the evening, we entered Etah bay, looking for some of the Arctic highlander Eskimos, but none were there, and we only saw a number of their sod houses, and a small pile of coal, left by Peary, who had his headquarters there, on one of his earlier attempts to reach the pole. We were now near the scenes of disaster following many of the early attempts at Arctic exploration. A few miles south of Etah is the lonely grave of Sontag, the astronomer; to the northward, a short distance, is Lifeboat Cove, the place of trial of Kane and Hayes, and the wreck of the 'Polaris'. On the western side of the sound is Cape Sabine, where the final disasters, starvation and death met the Greely expedition; in fact, both shores of the sound are chiefly memorable, for the death or the blasted hopes of enthusiastic Arctic explorers.

There was considerable ice about Etah, and the pans in several places were thickly covered with walrus, the total being in the thousands. We continued northward to Littleton island, where heavy ice was met, and it was decided to attempt a crossing to the southward of it. On the way to Cape Sabine, we passed some very heavy ice; the cakes, in many places, were miles in extent, and floated high above the water. These were of the Arctic ice, which had passed down through Kennedy channel, into Smith sound, and then on into the northern part of Baffin bay.

Cape Sabine was reached at one o'clock on the morning of the 11th, and the heavy bumping in crossing was but a foretaste to the excitement of that day. The ship was stopped behind a small island, just south of the cape, where, accompanied by the Captain and the Doctor, I landed on the rocky granite shore, about half a mile south of Parry's last headquarters. We walked over to his house, which was originally the deck-house of the *Windward*. Close to it is another small house, built of rough lumber, the residence of the Stein party. Both are very small, and the surroundings dreary, while the amount of decaying walrus blubber, scattered about, rendered the rocks slippery and the air slimy. A few bodies of dead Eskimos, wrapped in musk-ox skins, were covered with small piles of rocks, within a few yards of the houses, and must have proven pleasant company during the dreary winter. A couple of photographs were

taken, and a copy of the Proclamation, taking formally possession of Ellesmere's island, was tacked on the inside of the house.

We then returned to the boat, and found, that during our absence, a heavy floe some miles in extent, had come in, and had forced the ship to leave for safety. The ice was fast closing on the shore, and we had a narrow escape from being caught between it and the land, but finally reached the ship in safety. All night ice was forming between the pans, showing the first signs of the coming winter.

We now steamed southward, across the bay to Cape Herschell; when about half way across, the ship struck violently upon the summit of a sharp rock, but luckily had way enough to carry her over without hanging. Several icebergs were close along side, and a sounding taken within a hundred yards, gave seventy fathoms of water. An inspection was immediately made, but no apparent damage could be found, beyond an extra amount of water to be pumped; the keel appearing to have taken all the blows.

We landed at Cape Herschell, where we hoisted the Canadian Flag; read the Proclamation taking formal possession of Ellesmere island and adjacent islands, in the name of the King, for the Dominion; and a copy of the Proclamation was deposited in a large cairn, on the extreme point of the cape.

No time was lost getting southward, away from the heavy ice pouring steadily past Cape Sabine, and we soon were in much looser and thinner ice, most of it apparently from the bays on the coast and, quite different from the heavy Arctic floes.

There was considerable ice along shore, so we were obliged to keep from three to ten miles from the land. In this manner, we steamed southward all day, passing large fields of ice, formed of cakes of heavy Arctic ice cemented together by thinner and smoother ice, probably formed about the heavier cakes during the past winter in the adjacent bays. Several times the ship was forced to butt her way through tight places, and the difference between this heavy ice and that of the Hudson bay was noticeable in the shock to the ship. Mr. King made a sketch of the coast, as far south as Cadogan bay, which is very different from that laid down on the charts. There is a marked contrast between the amount of ice and snow upon the land on the west side, and that of the Greenland coast, directly opposite, all to the advantage of the latter. The land, from Cape Sabine to Cadogan bay, is high and bold, becoming slightly lower towards the south. The shores are deeply indented with bays and fiords. Only prominent capes are partly bare of snow and ice; the remainder of the coast is buried beneath a thick mantle of white, with only a favoured pinnacle rising its dark summit, here and there, above the monotonous snow. Farther inland, there appears to be a continuous icecap; and from it, in every valley, active glaciers flow down into the bays, where they discharge numerous icebergs. The granite rocks extend southward from Cape Sabine to Cape Isabella, when they are replaced by a system of bedded sandstones, identical with those of the northern coast of Greenland. Owing to the ice, no landing could be made on the coast, and consequently, a close examination was impossible; but these bedded rocks appeared to be greatly contorted, near their contact with the granites, leading to the belief that they were older than the latter; while their marked resemblance to the sandstones and associated traps of the Animikie c Hudson bay and Labrador, leads me to class them as much older than the age given to the corresponding rocks of Greenland, which, on account of a resemblance to the rocks of Disco island, have been called Tertiary. These rocks again gave place to the Laurentian granite at Cadogan bay.

Towards evening, the weather became foggy; and the ice forced us away from the coast; so that at seven o'clock, the work of surveying had to be given up. Thick fields of ice forced us to the eastward, during the night, and the next day proving foggy, we only sighted land, for a few moments in the morning; and not again, until five in the evening; when occasional glimpse were obtained of the low granite shores and islets, off Philpots island, near the mouth of Lancaster sound.

The weather continued dirty during the night, with a steadily falling barometer and strong easterly wind. The land was seen at intervals; and appeared to be high and broken, covered with ice, and having many glaciers, especially in Croker bay. To the westward of that bay, the irregular Laurentian rocks are capped, with upwards of a thousand feet, of nearly horizontal beds, of Silurian limestones. The character of the coast changes with the rocks; and to the westward of Croker bay, the country becomes

SESSIONAL PAPER No. 21

a flat tableland ; while the coast is very abrupt ; and is deeply cut by long, narrow bays ; so that it closely resembles, on a gigantic scale, the steep banks of a river running through a clay country.

Being short of water ; and the day promising to be bad, at eight o'clock on the morning of the 13th, we turned into one of these bays, Coming creek, a few miles west of Croker bay. We were obliged to steam ten miles up it, before we could obtain water shallow enough to anchor ; and were then about a mile from its head. A band of walrus were seen sporting about the bay.

The boats were sent off, in the afternoon for water ; and the scientific staff landed to collect natural history and geological specimens. I attempted to climb the limestone cliff ; and reached an elevation of 1,100 feet, about three hundred feet below the perpendicular summit. The cliffs are about 1,500 feet high ; and the land rises about 500 feet higher inland ; where it is capped with ice. The land, below the snow line, is exceedingly barren and desolate ; there is an absence of soil, broken limestone shingle being its only substitute ; and this is dry and quite barren ; only in the lower bottoms of the valleys was the moisture sufficient to produce a scant growth of Arctic grasses and plants.

An easterly gale blew all night and next day ; the wind falling towards evening. The weather was foggy and snow fell upon the upper hills. At eight o'clock in the evening, we got under way ; and at ten, were clear of the bay ; when turning westward, we steamed along the coast all night ; the fog lifted sufficiently to allow a sketch being made of the shore, which is fairly accurate on the charts. The underlying granite rocks, slowly dip beneath the level of the sea ; so that, a few miles to the west, only the nearly flat bedded limestones are seen in the cliffs.

Very few glaciers reach the sea, to the west of Coming creek ; and the tableland slowly decreases in elevation.

At eleven o'clock, on the morning of the 15th, we dropped anchor in Erebus harbour, at Beechy island, near the southwest end of North Devon. This is one of the most interesting places in the Arctic. Here Franklin wintered for the last time, before passing, with his ships the *Erebus* and *Terror*, to the westward ; where finally all perished, on the shore of King Williams island ; or, in the attempt to reach civilization, to the southward. Here, was also established, the headquarters of all the Franklin relief expeditions sent out for years afterwards in search of his missing ships. After fifty years, numerous traces remain of these expeditions : the frame of a large storehouse stands on a shingle terrace, a few yards from the western shore of the harbour, and close under the high hill forming the point. Inside, and in rows outside the building, are many casks of provisions, including peas, flour, oatmeal and cheese, all destroyed by the weather. Scattered about are hundreds of tins ; which once contained the infamous Goldner Patent rations, supposed to have been, one of the direct causes, of the loss of the ill-fated expedition. Remnants of clothing and many leather boot soles also were seen, together with a two-wheeled cart, of Admiralty pattern. On the beach, below, are the wrecks of a large sloop and a life-boat, left by the relief expeditions. Both have been badly broken by the ice ; and portions, of the mahogany planking, of the life boat, were taken for souvenirs. On a small terrace, immediately behind the house, is a wooden cenotaph erected to the memory of Franklin and his crews ; and lying along side is the large marble slab, sent there, by American citizens ; and left by McClintock in 1858 ; who, attached a brass plate to it. We raised the slab and photographed it ; and again laid it, inscription downward, along side the wooden monument. Should a cruiser again visit this memorable spot, material for a solid foundation for this slab should be taken ; as it cannot be erected in the strong winds that blow there, without some such precaution.

About half a mile, in rear of the house, on a desolate plain, are five graves containing the remains of some of Franklin's companions ; who died here, and some of the members of the relief expeditions. Leave was given to as many of the crew as possible to land here ; but the ice coming out of the inner bay forced us to leave before the graves could be photographed. We brought away the cart.

A sealed record was found, attached to the cenotaph ; and when opened it proved to have been left, on August 24, 1903, by the Swedish Magnetic Pole Expedition,

in the sloop *Gjoa*. The record stated that they were going southward down Peel sound. It was taken on board to be sent to the Swedish government.

At Beechy island, no ice could be seen to the westward, in Barrow strait: while northward only a few loose pans were in Wellington channel; and the prospects looked so favourable, for a Northwest Passage, that many of us regretted the lack of instructions to make such an attempt, if feasible.

The Canadians Flag was hoisted; and we read a Proclamation, taking formal possession of North Devon and adjacent island for the Dominion. A copy of the proclamation was left, in a sealed box attached to the Franklin monument.

Early in the afternoon, we steamed out of the harbour, bound southward, across Lancaster sound, to the island of North Somerset; late in the afternoon, a few stringers of ice forced us to the eastward; and the wind freshening to a gale from the northward, accompanied by fog, caused us to take refuge in Leopold harbour, on that island, at the entrance to Prince Regent inlet. We passed inside of the bold Leopold island, and rounding Cape Clarence stood southward a few miles, along the high castellated cliff of flat limestone; and so near midnight, rounded the low point, into this secure harbour. When entering, what appeared to be a boat, with a structure built alongside, was seen on the point, with a flag flying. Thinking that it might be some persons in distress, the whistle was blown; and as soon as the anchor was down, I sent the doctor ashore to relieve any one who might be there. Luckily our fears proved groundless, as the structure turned out to be a pile of boxes of provisions, for the *Gjoa*, built around the boiler of an old steam launch, left there by one of the Franklin search parties. We found later, that the provisions had been recently left by the whaler *Windward*, for the Swedish Expedition; and that they consisted largely of bread and butter.

A very heavy gale continued until the morning of the 17th, it being impossible, meanwhile, to land with a boat. Early that morning, I put ashore; and went through the ceremony of hoisting the flag, and reading a proclamation taking possession of North Somerset, leaving a copy of it in the boiler. The boiler and keel were all that remained of the steam launch. Evidences of the presence of Eskimos were found; and we brought on board a sled runner made of teak, probably obtained from the wreck of the *Fury* lost by Parry many years ago, farther to the southward in the inlet.

We left the harbour at eleven in the morning; and half an hour later were enveloped, in a thick fog; during the interval we had to steam slow, against a strong head wind, and luckily met with no ice.

The fog began to lift in the evening of the 18th, showing our position to be a few miles off Adams island, on the western side of the entrance to Navy Board inlet.

Later in the evening, the fog cleared, disclosing the high, broken land of Bylot island, with Wollaston islands in the foreground. A wide fringe, of heavy, broken ice, prevented us from approaching the coast. The land rises in fairly sharp peaks, nearly 2,500 feet above the sea; it is largely covered with snow, while glaciers fill all the larger valleys. The rocks are probably Laurentian.

We skirted the coast, as close as the ice would allow, all night; and next morning, having passed Cape Graham Moore, came upon an encampment of Eskimos, on the shores of a small cove, just inside the cape, on the northern shore of the entrance to Ponds inlet. Going ashore in the boat, we found thirteen tents on the banks of a small stream; only two or three men were there; the majority being away in whale boats belonging to the ketch *Albert*. Several women and children were about the tents; and in one, we found a poor fellow lying in his blood, having that morning had a severe hemorrhage; and apparently having received no attention since. We learned that there had been an epidemic of sickness, a fever accompanied in many cases with bleeding from the mouth. All able to do so, accompanied us on board; and there, had a good dinner, and a present of pipes and tobacco. They told us that the *Albert* was in Erik harbour, on the south side of the inlet; and that two of the Scotch whalers were about twenty-five miles, up the inlet, catching fish.

Taking one of the men as pilot, we steamed up the inlet; and at six in the evening, anchored along side of the *Diana* and *Eclipse* whalers, close to the mouth of a small river on the south side of the inlet.

SESSIONAL PAPER No. 21

There are two encampments of natives on Ponds inlet, the one we visited at Button point, and another about six miles farther up the inlet, on the same side. A number of Eskimos, from Cumberland gulf, were found living along side the *Albert* in Erik harbour. In all there are thirty-seven families at Ponds inlet, numbering thirty-six men, forty women, thirty-four boys and thirty-four girls. The only other natives in the northern part of Baffin island are those of Admiralty inlet; and they are only about a dozen families.

During the summer, these people live in skin, or cotton tents; during the interval between summer and winter their habitation are houses, dug out of the bank of a stream; with low walls rising two or three feet above the surface, and formed of a conglomeration of rocks, whalebones and sods. The entrance is below ground, and consists of a hole about two feet and a half in diameter. The door leads into a depression about six feet in diameter, with a bed, or bench extending from it, on all sides, to the wall, and about three feet higher than the floor; in fact the interior of these houses is very similar in arrangement to that of the snow houses. The roof is temporary; and is formed of the summer tentings. In winter they dwell in snow houses.

At the time of our visit, many of the Eskimos were inland after deerskins, for their winter clothing and bedding. They describe the interior, as being much warmer and less forbidding, than would appear from the coast. The country is broken, but not mountainous, with numerous lakes and wide valleys; where the barren-ground caribou are found in large bands. Even the forbidding Bylot island, which, from the coast, appear to be a mass of ice covered mountains, is said to be free of snow, after passing some ten or fifteen miles inland; but there are very few deer on it. In winter the natives all live at Button point, close to the open water; and there kill narwhals, seals and a few walrus for food.

Shortly after anchoring, we were visited by Captain Milne, of the *Eclipse*, Captain Adams, of the *Diana*, and Mr. Much, of the *Albert*. They all said that the present summer was the worst in their long experience, for fog and easterly gales. The *Diana* had been closed in the ice for twenty-seven days, and the *Eclipse* for twenty-one days, in crossing Melville bay: but this delay was nothing to the difficulties of the previous year days; when the *Balaena* had been fast for eighty days and the *Vega* at the same time, crushed and sunk.

There are only four Dundee whalers, small steam barques, in this year's fleet. Three, the *Eclipse*, *Diana* and *Balaena*, were now at Pond inlet, while the fourth, the *Windward*, was still at Prince Regent inlet, after white whales; but was expected daily.

To date, the catch of whales was as follows:—

Diana, 3 whales with bone weighing about 5 000 lbs.

Eclipse, 2 whales with bone weighing about 3,300 lbs.

Balaena, 1 whale with bone weighing about 1,500 lbs.

Windward, 1 whale with bone weighing about 1,500 lbs.

Albert, 2 whales with bone weighing about 500 lbs.

To this must be added the probability of the Fall catch, along the east coast of Baffin island, where the ships remain until late in the month of October.

From advices since the return of the whalers, it has been learned that the Fall fishery was without success, owing to the ice and early approach of winter.

The Scotch whalers carry large crews, and are thus quite independent of the natives.

The *Albert*, a large ketch, formerly belonging to the Deep-Sea Mission, arrived at Ponds inlet in the summer of 1903; and is used as a station. The boats belonging to this ship are manned, in part, by local natives, and in part by those brought from Cumberland gulf. The venture counting on this year's returns is not a commercial success to date. The two whales taken were very small, and the bone of inferior quality. The total receipts are augmented by a few bear and fox skins, and a few pounds of narwhal ivory.

Shortly after our arrival, a small net was borrowed from one of the whaling ships; and two boats sent to the mouth of the little river close by. Four casts of the net were made, to load both boats; and they returned to the ship, in less than two hours, with over a thousand fine Arctic salmon, aggregating over 5,000 pounds in weight, the

4-5 EDWARD VII., A. 1905

fish running from three to ten pounds in weight. There is no doubt that a profitable fishery could be carried on here.

On the 20th, Corporal Donaldson, who had been appointed Deputy Collector of Customs by Major Moodie, before leaving Port Burwell, was busy all day attending to his duties on board the whalers. I landed and examined the neighbouring country. The south side of the inlet rises in a succession of terraces cut into sands and gravels; these terraces rise to an elevation of upwards of six hundred feet, to the base of the rocky Laurantian hills behind. The lower terraces or broad plains, which extend for miles to the south and west; these are well covered with grasses and Arctic shrubs, and form a pleasing contrast to the snow-covered, barren, higher lands.

The small river and other streams have valleys cut deeply into the plain; and their banks show the stratification of the sands, clays and gravels. Small pieces of tertiary lignite are found in the river bed; and this points to these deposits having a greater age than the glacier period; and they may correspond to the coal bearing formations of the upper rocks of Greenland. Similar coal has been found in the drift, in a couple of places along the east coast of Baffin island, between Ponds inlet and Cumberland gulf, showing that the tertiary deposits may be quite extensive. The presence of this coal is probably unimportant in itself, as it is doubtful if the deposits are sufficiently extensive, and the quality of the coal sufficiently good to warrant the risk of transportation, or the cost of mining in these inaccessible places. But the presence of these deposits may prove important in respect to the possible deposits of alluvial gold in them; and it would be well, in the future, to test the beds of streams, flowing through them, for the precious metal.

The east wind continued strong during the two following days, and the banks of fog streaming through the narrows, gave us an idea of the weather outside. The wind dropping somewhat, on the afternoon of the 21st, all the ships got under way for Erik harbour, where we arrived near midnight in a thick fog.

Thick fog continued next day. Corporal Donaldson was busy all day collecting duties on the *Balaena* and *Albert* found anchored in the harbour. The tanks were filled with water; and I went ashore to examine the rocks and the glacier; which fills the western part of the head of the harbour.

Erik harbour is a deep narrow bay, on the south side of the entrance to Ponds inlet. The bay runs inland about three miles and its head is almost land locked, and affords an excellent anchorage.

The glacier, which empties into the bay, is nearly a mile wide, across its front; and flows down a wide valley, from the northwest. Its motion is very small; and it does not discharge much ice, into the sea. Its surface is very dirty; and there are two lines of moraine upon it. On its east side, it has piled up a ridge of clay and boulders, 50 feet high; and this ridge separates it, from the valley of a small stream, flowing down another large valley, from the southwest. The present glacier is only a small remnant of the great glacier which once filled the entire bay, as may be seen by the great deposits of boulder clay; which line the rocky walls, up to an elevation of 400 or 500 feet above the sea; and which extend outwards to the mouth of the bay.

In the afternoon the fog lifted somewhat; and we started on our southward voyage, with the intention of following the coast, as closely as possible, in order to correct the survey, which according to the whaling captains is very inaccurate. Shortly after getting clear of the bay, the fog again settled down, and meeting with ice we were obliged to stand off land. At eight o'clock, the tops of the hills could be discerned; but the sea and shores remained covered. As we progressed southward, the ice became thicker and heavier; and many icebergs were met with; so that we were forced once more to the eastward.

All night and next day we continued passing between large floes of heavy rafted ice. Towards morning the air thickened, and heavy snow showers occurred at intervals until noon. More compact ice continually forced us eastward, so that the coast was completely lost sight of.

Similar conditions prevailed on the 24th, only the ice was then so close, that progress could only be made by forcing the ship through it. On the following day the weather was calmer and clearer, and the ice thinner and looser.

SESSIONAL PAPER No. 21

The 26th was clear, until afternoon, when the fog again settled down thick. We steamed all day through comparatively loose ice, being now near the eastern edge of the pack. In the morning, two large whales were seen, and all day, harp and hooded seals were passed, asleep on the floating pans of ice.

After another foggy night, land was seen early in the morning, and proved to be Cape Walsingham, to the northward of Cumberland gulf. The ice prevented us from approaching; so we steamed southward until stopped by a tight pack. A second attempt was made to reach the land; and a good lead of open water, was found, about five miles from it. This opened out, and the swell coming in, we were in hopes, that we had finally parted with the ice, when in the evening we lay-to off Cape Mercy. The swell and increasing wind made things very interesting on board all night.

In the morning at daylight, we steamed southward, along the edge of a heavy pack of ice, until six o'clock; when the ice opened somewhat, and the ship was put into it; and we continued to butt our way through it all day, trying to get into Cumberland gulf, but, owing to the heavy fog and rain, no sight of the land could be obtained. The ship continued to bump her way through very heavy ice, all night, until eight o'clock next morning; when the ice became so tight, that farther progress was impossible. The weather clearing later showed us to be, about three miles from Warcham island, on the north side of the gulf. Later in the day, a brig was seen fast in the ice, about ten miles to the southward.

We remained beset, until the afternoon of the 30th, when, by hard ramming, the ship was forced over to the brig before dark; and we remained until daylight next morning, along side of her.

The strange ship proved to be a small Norwegian vessel, in no ways prepared for ice; and her captain was justly very anxious for her safety. She had on board the supplies for the whaling and mission stations, in the gulf; and carried, as passengers, the Rev. Mr. Greenshields and two men, for the whaling stations. We took on board the mail and invoices of goods, for the stations; and shortly after leaving the brig, got into comparatively open water; and arrived at Blacklead island, at eight, in the morning.

Corp. Donaldson was sent ashore, to attend to the Customs work and was busy all day. The Rev. Mr. Peck came on board, and I obtained from him, much valuable information relating to the Eskimos, under his charge; which will be very useful in the report of the expedition.

The past year had been a bad one, both for the whalers and the natives. Heavy easterly gales prevailed during the fall and winter; so that, although whales were seen, the boats could not be launched in pursuit of them. In October, an extraordinary high tide occurred in the gulf; which rose twenty feet above ordinary spring tide; and swept away considerable belongings of the natives, at Blacklead and Kikerton. Heavy gales prevailed throughout the winter, preventing the formation of solid ice, and greatly hampering the natives in travelling and hunting seals and walrus; so that many, about Kikerton, were in a chronic state of starvation. In March, an extra heavy gale broke up the ice, nearly three feet thick, on which forty Eskimos were encamped; during their retreat to safety, three persons died of exposure or drowning. The gulf was blocked during the entire spring and summer, with heavy ice, so that the whales were unable to enter. In consequence no whales have been taken at Blacklead, or Kikerton, nor at Cape Haven where similar condition prevailed.

The trade of the gulf, this year, is confined to about 3,000 sealskins, of little value; some thirty casks of seal oil; and a few walrus, fox and bear skins. The whole not reaching the value of the provisions sent out to support the stations. At Cape Haven, a larger number of walrus and bears were taken; but not in sufficient numbers to afford a profit on the station.

From the summit of Blacklead island, heavy ice could be seen extending as far as Kikerton; and as the ship for the station was still tightly beset, and might so remain for days, no extra Customs work could be done by a visit to Kikerton; it was resolved not to undertake that trip; and on the afternoon, of September 1, we left Blacklead for Cape Haven.

Keeping along the north side of the gulf, fairly loose ice was met with, until about six o'clock; when the floes becoming closed, we were forced to butt our way contin-

uously until dark, when we laid up for the night; next morning an hour's heavy work brought the ship to open water, with a wide margin of ice between her and the land. Large, loose stringers forced us gradually away from land, until, at four in the afternoon, open water and a heavy swell, showed that the southern edge of the pack had been reached. Standing towards the land, in the evening, the heavy ice along shore was again reached off Cape Haven: where we remained during the darkness. At daylight, the ship was forced through the heavy ice, into Cyrus Field bay; and stopped about five miles from Cape Haven station. The vigorous blowing of the whistle brought off a whaleboat-load of natives, chiefly women. From them, it was learned, that Captain Jackson had left the station about ten days previous, on his way to Blacklead. No vessel had as yet been there with supplies; and the catch of station was very small; and there were no provisions there. A letter for us, was said to be at the house so a boat was sent for it. Owing to the ice, the boat took nearly three hours to go and come; and returned with news that the letters were for the owners of the station. During the absence of the boat, it was discovered, that the lower stem-plate had been lost, and that the lower part of the stem was considerable broken, thus accounting for the extra leakage of the ship; which required pumping every few hours.

Leaving Cape Haven, at nine o'clock, we were soon free of the heavy ice for the last time. Hall island was passed at one o'clock; and at eight in the evening we were off Black bluff on Resolution island.

With fine weather, we continued on all night; and reached Port Burwell at ten o'clock Sunday, September 4. No ships had been there during our absence, and consequently we had to take on board the coals, cutfit and provisions left for the Mounted Police, as agreed with Major Moodie, previous to his departure. This work occupied the ship's crew for two days, during which, the boiler was blown down, and some necessary repairs made to leaking tubes.

Port Burwell was again left on the morning of the 7th, and the *Neptune* steamed westward, against a light southwest wind, accompanied with snow flurries and fog until evening, when a shift of the wind to the northward brought clearing weather. A strong northwest wind was blowing next morning, against which the ship made little progress; so advantage was taken of adverse circumstances, to explore the harbour of Wakeham bay. At noon the anchor was dropped in an excellent harbour formed by the peninsula at the entrance to the bay on the south side. The approach is good, the only danger being from a low rock, awash at high tide; which lies a couple of miles off the mouth of the barbour, on the south side. There are other small islands further in, but they are well to the southward, and quite out of the track. The mouth of the bay should be well opened before the ship turns in, and then there is deep water all the way to the anchorage.

In the afternoon, I went exploring for water, and five miles farther up the bay, came upon an encampment of natives, living in six skin tents. Only a few women and children remained at the place, the rest being gone overland to visit the ship. On our return, we found that some had arrived; and more came during the evening. They received the customary presents of pipes and tobacco together with as much as they could eat. Afterwards, a distribution of books, sent by the Rev. Mr. Peck, was made; immediately on receiving them a religious service, consisting of singing, readings of portions of scripture and prayer, was held, all joining readily in the service. They had learned from the Eskimos at Fort Chimo; where they go annually in the Spring to trade; and where they usually remain a few days. The Fort Chimo natives in turn had received instructions from visiting natives, from the mission stations, on Hudson bay. I distributed more of these books later among the Eskimos of the western side of Hudson bay; and they were delighted to get them; some of the younger people had already learned to read, from the Eskimos who accompany the whaler *Active*; and who come from the north side of Hudson strait, and had received their instruction from Cumberland natives.

The chief of the tribe was secured as a pilot, he being well acquainted with the coast to the westward as far as Cape Wolstenholme.

Leaving Wakeham bay next morning, we passed through King George sound, taking frequent soundings and correcting the coast line. Fog and snow flurries

SESSIONAL PAPER No. 21

coming on, when opposite Douglas harbour, the ship stood in, and I landed near the entrance, where three families of Eskimos were encamped; only the women were at home, the men being away hunting.

The weather clearing somewhat later, we continued on; and following the coast got into shallow water, behind an island, a few miles east of Cape Weggs. The fog now became too thick to carry on the work of surveying, so we stood away for Charles island. We arrived off the east end of the island, and early next morning steamed up its north side. The smoke of a steamer, bound east, was noticed at seven o'clock; and the ship was turned to intercept it, but the stranger was too far to the northward, and passed without speaking. It was a two masted steamer, more of the appearance of an ordinary tramp than of a whaler; and was supposed to be the ship of the French Fur Company, trading in southern Hudson bay, and sailing from Canada.

Great numbers of walrus had been seen, the previous year, at the west end of Charles; and we hoped to kill some of them for museum specimens, and for dog-feed for the Police Detachment at Fullerton; but this year they had disappeared, and only two were seen.

Rounding the west end of Charles island, we stood over to the south shore, to continue the survey. A large bay was seen on the mainland to the eastward, of the west end of the island; and we made for its entrance; but meeting with comparatively shallow water some miles off its mouth, did not enter. Our pilot said that it was an excellent harbour; and that a steamer had twice anchored in it. This was probably the *Arctic*, as Captain Guy of that ship told us, at Ponds inlet; that he had twice anchored in an excellent harbour to the southward of Charles island.

Passing westward along the coast, for twenty-five miles, the mouth of another long narrow bay was reached, called Sugluk, by the pilot. Turning the ship into it, a patch of shallow water was passed over near the mouth, probably due to the closeness of the eastern shore. Inside the water was deep, and an anchorage was found, on a bench, on the east side, about five miles from the mouth. I explored the remainder to its head, with the launch. The bay has an average breadth of about a mile and continues about seven miles beyond the anchorage. Two miles from its head, a shallow bar, partly bare at low water, crosses the bay; and the tide was found running in a strong rapid over it, with the rising water. Three families of natives were found encamped at the head. They were unacquainted with white men; never having visited any of the trading posts; but getting their supplies of guns and ammunition, by barter, with their eastern neighbours. The approach of darkness caused our stop here to be very short, as it was necessary to pass the rapid before dark. The launch took over an hour to pass up the rapid; and the ship was not reached until half past nine.

The next morning was employed filling the water tanks, from a small stream about two miles from the ship. In the afternoon we continued westward, and reached Erik cove at dusk.

The ship was now headed northward, for Salisbury island; and the following morning, we were off its northeast point. The northern shore was closely followed, in making a survey of it. The side of the island rises abruptly, from 500 to 1,000 feet above the sea. The deepest water in Hudson strait is found along it, for no bottom was obtained at 230 fathoms, the total length of the sounding line. Very strong tides flow backwards and forwards along the island, causing a nasty sea with opposing winds. Three icebergs were seen at the east end of the island, and another large one was aground inside a small island at the northeast end. Heavy flurries of snow borne on a strong westerly wind, occurred at intervals all morning, increasing in duration and frequency, so that they were almost continuous by noon. The unfavourable weather, the approach to the dangerous, unchartered waters about Mill islands, with its strong currents, together with an ice-sky to the westward, all led to the determination to turn back, and to pass to the southward of Nottingham island.

This was done, and the soundness of the judgment was manifested, when Fox channel ice was met with, about 15 miles to the westward of Nottingham, and apparently completely filling, to the northward, the wide channel between Salisbury and Southampton islands. Owing to the tender state of the bow, without its lower stem-plate, all care was taken to avoid the ice; and, in consequence, the course was changed to south

4-5 EDWARD VII., A. 1905

erly, skirting along the ice-edge, which extended southwesterly across the mouth of Fisher strait, and a few miles into the channel, between Coats and Mansfield islands.

Cape Southampton was rounded on the evening of the 14th and the course laid for Fullerton. Next evening, just before dark, a vessel was seen to the westward; on nearer approach, it proved to be the Scotch whaler *Active*, bound from Repulse bay. Captain Murray came on board, and reported that the ship had one whale with 1,300 pounds of bone, beside a considerable number of walrus, white whales and bears. At the station, at Repulse bay, one whale had also been captured, having 500 pounds weight of bone. This together with some white whales and musk-ox skins were the total returns of this station. Repulse bay had, during our absence, been visited by Sergt. Dee who had transacted all the customs business in connection with the ship and station.

Captain Murray informed us that the mica mine belonging to his owners, was situated, on Lake harbour, just east of Big island, on the north side of Hudson strait. Nine white men and a number of natives were employed there during the summer. The harbour is somewhat dangerous of approach, and a pilot is necessary the first time of entering it. The *Active* was bound there to pick up the whites and take them home. Advice was given to visit the mine in the early summer.

Fullerton harbour was safely entered next morning, and we found the Mounted Police detachment and our old native friends all congregated to welcome the ship. Nothing serious had happened during our absence, beyond the illness of two members of the detachment, whose cases were so grave that Dr. Borden considered their return home necessary to the preservation of their health. The ship remained at Fullerton until the 28th, the time being used to land stores, take in ballast, shift coals and fill tanks. During this time the weather was cold and boisterous; the land was covered with snow and the smaller ponds frozen fast.

The *Era* entered the harbour on the 17th for winter quarters. She had been unsuccessfully cruising in Roes Welcome and Repulse bay. Only two whales had been seen, one of them was among thick ice and the other, though closely approached, was missed. The crew, in consequence of this want of luck, are not looking forward to a very cheerful winter.

The return voyage, from Fullerton to Port Burwell was made in very fine weather. The only interesting items, in connection with it, was the completion of the survey of the south coast of the strait, between the west end of Charles island and Douglas Harbour; and the stop made at Wakeham bay to land our pilot, taken from that place. Fully eighty natives were there to welcome him home, or rather to visit the ship. A number of interesting photographs were taken of these natives, and their kyaks and womens' boats.

We arrived at Port Burwell at noon, on October 1, and had only been in the harbour two hours when the *Arctic* was sighted. They tried to come in from the north, and we had to send a boat to pilot them safely.

Major Moodie immediately boarded the *Neptune* bringing your letter relieving us, and ordering the *Neptune* home, to the delight of all on board.

The *Arctic* remained until seven o'clock, when she left for Fullerton; whilst along side I supplied Major Moodie with a number of articles of equipment, not included in that of the *Arctic*.

A strong southeast gale kept us at Burwell, until the 4th, the intervening time being spent in shifting coals and ballast, and in sending ashore some coal requisitioned for by Major Moodie.

We left Port Burwell early on the 4th, and after a fair passage southward, along the Labrador coast, reach Chateau at dusk on the 7th, where a boat landed with telegrams announcing our arrival in civilization.

We had a nasty southwest gale, while crossing the gulf, but the *Neptune* behaved admirably; and landed us safely at Halifax on October 11, after an absence of a year and fifty-one days; during which we steamed over ten thousand miles, through Arctic seas often covered with thick streams of ice.

Before closing this summary report, I must express my obligations to Captain Bartlett, the officers and crew of the *Neptune*, who, one and all, have had a personal

SESSIONAL PAPER No. 21

interest in the carrying out of our instructions ; and to whom the successful accomplishment of the work is largely due.

A long winter, closely confined to the small quarters of a ship, is very trying upon the good nature and cheerfulness of a large body of men ; and it is my pleasant duty to report that throughout the voyage, not the smallest sign of insubordination occurred, every one performing his duties in a cheerful manner and with a proper spirit.

To Captain Bartlett is due the credit of having navigated the *Neptune* with safety through nine hundred miles of Arctic ice, as well as taking her along several thousands of miles of practically unknown coasts, in very bad weather. He has successfully proved that a suitable ship is able to leave Halifax in the early summer, pass through Hudson strait to the west side of Hudson bay, returning steam northward to Smith sound and westward to Beechy island in Lancaster sound, and on her voyage southward, visit the whaling stations at Pond inlet and Cumberland gulf, returning to Halifax early in October.

The thanks of the ship's company are due to Dr. Borden for his efficient and careful treatment of all the ailments incident to such a long voyage. Personally I am indebted to Dr. Borden, for his willing help in regard to the study of the Eskimos, and for his assistance in the Natural History work of the Expedition.

Messrs. Halkett, King and Caldwell, who formed part of our scientific staff, have all performed their respective work, in a very efficient way, and to these gentlemen is largely due the large collections of Natural History and Geological specimens now brought home, and they are also accountable for the many improved changes to be made to the Arctic charts

A summary report of the Geological and Natural History work accomplished by the expedition is being published in the annual report of the Geological Survey ; and a full report of the expedition is well advanced and will be ready for publication shortly.

The following summary of work accomplished by the expedition shows the amount of useful information, which may be obtained, at small cost, by trained men accompanying such an expedition.

SUMMARY OF WORK ACCOMPLISHED BY THE OFFICERS AND SCIENTIFIC STAFF ON
BOARD THE D. G. S. ' NEPTUNE ' 1903-04.

The *Neptune*, from Halifax until her return to that port, steamed 10,000 miles. Of this 9,100 miles was through water, and 900 miles through heavy ice. The distance steamed through ice is at least twice that of the course, owing to the number of turns and twists required to work through the ice. In consequence the actual ice-mileage should be given as 1,800 miles ; and the total 10,900 miles. This is probably the greatest ice-mileage ever made in one season by any ship.

SURVEYS.

	Miles.
Log and compass surveys of coast-line, checked by astronomical observations; previously unsurveyed, or roughly sketched-in by sailing vessels	1,175
Numerous astronomical observations, for the position of Fullerton, and accurate chain and micrometer surveys of the harbour and environments of Fullerton	91
433 soundings, taken through six feet of ice, in the harbour and approach to Fullerton	
During the time, that the <i>Neptune</i> was at winter quarters at Fullerton, the western coast of Hudson bay was geologically examined, from the head of Chesterfield inlet to the head of Wager inlet, and track surveys made of that distance	610

4-5 EDWARD VII., A. 1905

	Miles.
While the <i>Neptune</i> was fast in winter-quarters, a boat trip was made to Southampton island, and a track survey and geological examination made a part of its western shore	70
During the absence of the <i>Neptune</i> to the Northward, a boat survey of the east side of Ungava bay, resulted in the geological examination of	95
Total mileage of Surveys	2,041

GEOLOGICAL AND NATURAL HISTORY WORK.

Besides the work mentioned above, geological examinations were made at every place touched at by the *Neptune* ; and a considerable amount of information was obtained about the rocks and glaciers of the north.

Large collections of rocks and fossils were made.

A close study of the manners and customs of the Eskimos was made during the winter, of the natives about the ship. Measurements of typical Eskimos were made, and a good series of photographs of these people, and their habitations obtained. The diseases of the natives were studied and reported upon. A census of all the natives of Baffin island, the southern side of Hudson strait and the western side of Hudson bay was made.

A large collection of the northern birds was obtained, together with a very fine collection of the eggs of many rare birds, often accompanied by the nests.

A number of skins and skeletons of the northern animals, including a group of six Musk Oxen, were prepared for Museum purposes.

Several fishes of the northern seas and fresh waters were obtained, and specimens preserved in formaline.

The use of the dredge, secured important collections of marine invertebrates ; while those of the ponds were taken in nets.

A fine collection of Arctic plants was made at the several places called at, and a number of interesting insect specimens secured at the same time.

A great amount of information concerning the habits and distribution of the important animals including the whales and seals was obtained at all places visited.

METEOROLOGICAL OBSERVATIONS.

Weather observations, including readings of thermometers, barometer, rain and wind gauges, were taken daily throught the voyage. During the winter months observations were taken at intervals of four hours.

An interesting series of weekly measurements were made of the thickness of the ice in the harbour.

ICE OBSERVATIONS.

While in the ice, continuous notes were kept of the character, thickness, extent, and kind of ice met with. These observations are particularly important in regard to the coming commercial navigation of Hudson bay and strait.

In connection with this question all the information possible was collected concerning the tides and currents of these waters, and also of the ice-laden currents of Baffin bay and Davis strait.

I have the honour to be, sir,
Your obedient servant

A. P. LOW.

Officer in Command of the Dominion Expedition to Hudson
Bay and Northward, on board the '*Neptune*.'

OTTAWA, December 16, 1904.

APPENDIX No. 13.

REPORT ON SIGNAL SERVICE, CANADA.

OFFICE OF THE SUPERINTENDENT,
QUEBEC, Nov. 22, 1904.

SIR,--I have the honour to inclose herewith the annual report for the Signal Service for the year ending June 30, 1904.

I have the honour to be, sir, your obedient servant,

Col. F. GOURDEAU,
Deputy Minister,
Marine and Fisheries,
Ottawa.

J. U. GREGORY,
Agent Department of Marine and Fisheries.

SIGNAL SERVICE.

QUEBEC, Nov. 22, 1904.

As in preceding seasons, reports have been received from the stations in the lower part of the river and gulf, recording the weather, wind, condition, location and movement of the ice during the winter and spring months, and during the season of navigation all inward and outward bound vessels as signalled when passing each station. From the close of navigation until the opening of navigation three reports were obtained per week and forwarded to the Board of Trade, Montreal, St. John, N.B., and Quebec, and to the Chamber of Commerce, Halifax, N.S., also to the press of Montreal and Quebec, to the agent of the Department, Quebec, to the Custom House and Immigration Agent, to the agents of steamship lines, tug owners, to the pilots for below and above Quebec, also to Messrs. H. Fry & Co., Lloyds Agents, Quebec.

From the beginning of April reports were received twice a day and forwarded as above.

The Chief Superintendent of the Quarantine Station at Grosse Isle is also supplied with full information as to weather, wind and the incoming of all transatlantic or foreign vessels.

The quarantine doctor at Rimouski is also supplied with a report of the incoming mail steamers, name of station and hour of passing being given when vessel was first signalled.

Information was supplied from the bureau here, as in past seasons, to the agents at Anticosti, Magdalen Islands, Meat Cove, C.B., Cape Ray and Cape Race, Newfoundland, from the beginning of April, as to weather, wind, movement and condition of the ice in the gulf and river St. Lawrence up to Montreal, for the guidance of any vessel calling for information.

Information as to wind, weather and ice in the vicinity of Anticosti, Magdalen Islands, Meat Cove, St. Pauls Island and Cape Ray, Newfoundland, is also sent to Point aux Esquimaux in March, for the guidance of the sealing fleet.

All inward bound vessels showing their official numbers will be reported from Marine Signal Stations in the river and gulf of St. Lawrence immediately, and all reports promptly posted on the bulletin boards of the Great North Western Telegraph Company's office in Quebec and Montreal.

Blue lights were supplied the signal officers at Belle Isle and Point Amour to indicate to any passing vessel sending up distinguishing rockets that their night signals were recognized and they would in consequence be reported.

I have the honour to be, sir, your obedient servant,

J. U. GREGORY,
Agent Dept. of Marine and Fisheries and Supt. of Signal Service.

PORT OF HALIFAX, N.S.,

PARTICULARS of Vessels Signalled during

YEAR OR MONTH.	BRITISH MEN OF WAR.			FOREIGN MEN OF WAR.			STEAMERS, 1ST CLASS.			STEAMERS, 2ND CLASS.		
	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.
1903.												
July	3	3	0	3	3	0	13	13	0	81	73	8
August	0	0	0	3	3	0	11	11	0	78	72	6
September	3	3	0	2	2	0	24	24	0	82	73	9
October	5	5	0	0	0	0	21	21	0	85	70	15
November	4	4	0	0	0	0	16	16	0	77	67	10
December.	0	0	0	0	0	0	29	29	0	91	76	15
1904.												
January	0	0	0	0	0	0	27	27	0	54	50	4
February	0	0	0	0	0	0	20	20	0	38	32	6
March	3	3	0	0	0	0	33	32	1	46	39	7
April	1	1	0	1	1	0	42	42	0	48	45	3
May	1	1	0	0	0	0	27	27	0	73	69	4
June	1	1	0	1	1	0	33	29	4	96	85	11
Yearly total	21	21	0	10	10	0	296	291	5	849	751	98

HALIFAX, N.S., July 1, 1904.

SESSIONAL PAPER No. 21

SIGNAL SERVICE.

the Year ending June 30, 1904.

SHIPS AND BARQUES.			BARQUENTINES.			BRIGS AND BRIGANTINES.			SCHOONERS, 3 MASTED OR BEAR- ING PRIVATE SIGNALS.			MONTHLY TOTALS.		
Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.
0	0	0	0	0	0	0	0	0	8	8	0	108	100	8
6	5	1	0	0	0	0	0	0	9	7	2	107	98	9
4	4	0	1	1	0	5	5	0	0	0	0	121	112	9
1	1	0	0	0	0	4	4	0	0	0	0	116	101	15
1	1	0	0	0	0	0	0	0	1	1	0	99	89	10
0	0	0	0	0	0	0	0	0	1	1	0	121	106	15
0	0	0	0	0	0	0	0	0	2	2	0	83	79	4
1	1	0	0	0	0	0	0	0	0	0	0	59	53	6
1	1	0	0	0	0	3	3	0	0	0	0	86	78	8
1	1	0	0	0	0	6	6	0	0	0	0	99	96	3
5	5	0	2	2	0	0	0	0	7	6	1	115	111	5
4	4	0	0	0	0	0	0	0	7	7	0	142	127	15
24	23	1	3	3	0	18	18	0	35	32	3	1256	1150	107

GEO. BUTLER, L. Q'M. R.E.,
Superintendent of Signals, Halifax.

APPENDIX No. 14.

STATEMENT of Revenue of Marine and Fisheries Department for Fiscal Year ended June 30, 1904.

Service.	—	Refunds.	Amount.
	\$ cts.	\$ cts.	\$ cts.
Harbour, piers and wharfs	11,027 76	.....	11,027 76
Dominion steamers	21,534 72	267 19	21,267 53
Winter mail service.....	134 78	.....	134 78
Examinations, masters and mates.....	4,797 00	2 00	4,795 00
Fines and forfeitures	150 00	137 40	12 60
Steamboat inspection fund.....	9,741 34	42 56	9,698 78
" engineers' certificates	1,090 00	.....	1,090 00
" of barges... ..	30 00	.....	30 00
Sick mariners' fund	62,243 23	464 94	61,778 29
Marine registry searches.....	68 29	.....	68 29
Signal station service.	2,781 66	.....	2,781 66
Casual revenue, sundries.....	15,963 01	140 64	15,822 37
			128,507 06
FISHERIES.			
Ontario.....	2,578 48	.....	2,578 48
Quebec.....	5,070 64	400 00	4,670 64
Nova Scotia.....	3,716 75	31 00	3,685 75
New Brunswick.....	10,643 20	50 00	10,593 20
Prince Edward Island.....	1,983 42	.....	1,983 42
Manitoba	4,002 70	.....	4,002 70
North-west Territories.....	922 50	.....	922 50
British Columbia.....	56,904 34	.....	56,904 34
Yukon Territory.....	240 00	.....	240 00
Hudson Bay.....	10 00	.....	10 00
			85,591 03
Licenses to United States fishing vessels .....	.....	.....	10,165 50
			95,756 53

RECAPITULATION.

Marine revenue.....	128,507 06
Fisheries revenue.....	95,756 53
	224,263 59

F. GOURDEAU,
Deputy Minister of Marine and Fisheries.

A. W. OWEN,
Accountant.

APPENDIX No. 15.

GENERAL SUMMARY of Expenditure for Fiscal Year, 1903-04.

Service.	Amount.	Total.
	\$ cts.	\$ cts.
Ocean and River—		
Maintenance and repairs to Dominion steamers.....	306,171 01	
Damages awarded merchants for losses on perishable goods owing to detention of <i>Minto</i> and <i>Stanley</i> in ice.....	9,401 70	
Examination of masters and mates.....	7,761 17	
Rewards for saving life, &c.....	11,763 12	
Investigations into wrecks.....	3,570 28	
Registry of Canadian shipping.....	1,203 56	
Removal of obstructions in navigable rivers.....	752 60	
Tidal service.....	21,871 71	
Winter mail service.....	8,912 57	
Marine biological stations.....	2,996 54	
Export cattle trade.....	3,504 43	
Montreal pilotage.....	2,050 00	
Purchase land at Halifax for wharfs, &c.....	15,119 11	
" " Char'ottetown for wharfs, &c.....	13,000 00	
Naval schools.....	6,106 54	
Wireless telegraphy.....	18,847 31	
Unforeseen expenses.....	3,977 63	
		437,009 28
Lighthouse and Coast—		
Salaries and allowances of light-keepers.....	230,179 61	
Agencies, rents and contingencies.....	20,866 26	
Maintenance and repairs to lighthouses.....	382,178 34	
Maintenance and construction Lurcher and Anticosti lightships.....	31,517 80	
Construction of lights and aids to navigation.....	540,675 07	
Salaries of temporary officers.....	11,448 10	
Signal service.....	7,740 01	
Repairs to wharfs.....	1,300 89	
Parliamentary returns.....	492 10	
		1,226,398 18
Scientific Institutions, Surveys, &c.		
Toronto observatory.....	2,784 84	
Meteorological service.....	87,522 15	
Hydrographic surveys.....	34,816 53	
" " St. Lawrence River.....	1,635 10	
" " Lake St. Louis.....	1,332 21	
" " Lake St. Francis.....	3,583 11	
		131,673 94
Marine Hospitals—		
Care of sick seamen in marine hospitals, &c.....	49,786 68	
Shipwrecked and distressed seamen.....	515 10	
		50,301 78
Steamboat Inspection.....		33,723 12
Hudson Bay Expedition.....		178,638 94
A. Couillard, gratuity.....	600 00	
Widow of late W. Owen, gratuity.....	360 00	
H. J. Cartier, compensation.....	250 00	
		1,210 00
Carried forward.....		2,058,955 24

GENERAL SUMMARY of Expenditure for Fiscal Year 1903-04—*Concluded.*

Service.	Amount.	Total.
	\$ cts.	\$ cts.
Brought forward total Marine.....	.....	2,058,955 24
FISHERIES.		
Salaries and disbursements of fishery overseers and wardens.....	105,111 40	
Building and maintenance of fish breeding establishments.....	109,286 07	
Fisheries protection service.. ..	130,231 95	
Steamers to replace <i>Acadia</i> and <i>Petrel</i>	74,422 71	
Building fishways, &c.....	3,381 88	
Legal and incidental expenses.....	1,977 86	
Canadian fishery exhibit.....	3,445 62	
Distributing fishing bounty....	5,024 11	
Oyster culture.....	3,549 74	
Cold storage.. ..	24,952 75	
Georgian Bay laboratory.....	1,500 00	
To investigate matters respecting sardine, herring and oyster fisheries.....	6,779 11	
Seizures by Russian cruisers.. ..	4,670 00	
Balance of divisible expenses in Behring Sea arbitration	629 46	
Licenses of United States vessels	511 65	
Fisheries revenue....	456 00	475,930 31
Fishing bounty.		158,943 70
Civil Government salaries.....	77,419 11	
" " contingencies.. ..	14,565 96	
		91,985 07
Total Marine and Fisheries.....	.....	2,785,814 32

F. GOURDEAU,
Deputy Minister of Marine and Fisheries.

A. W. OWEN,
Accountant.

APPENDIX No. 16.

STATEMENT of Sick Mariners' Dues collected for the fiscal year ended June 30, 1904.

<i>Quebec.</i>	\$ cts.	<i>Nova Scotia—Continued.</i>	\$ cts.
Gaspé.....	126 80	Liverpool.....	111 42
Montreal.....	8,443 92	Lockeport....	20 00
Paspebiac.....	216 38	Lunenburg.....	574 34
Percé.....	80 38	North Sydney.....	1,065 48
Quebec.....	8,101 68	Parrsboro.....	697 62
Rimouski.....	206 92	Pictou.....	398 76
St. Armand.....	7 92	Port Hawkesbury.....	230 02
St. Johns.....	1,436 64	Port Hood.....	36 66
Three Rivers.....	513 92	Shelburne.....	113 12
Total.....	19,134 56	Sydney.....	3,435 75
		Truro.....	5 48
		Weymouth.....	127 12
		Windsor.....	957 88
		Yarmouth.....	551 90
<i>New Brunswick.</i>		Total.....	19,544 57
Bathurst.....	219 68		
Campbellton.....	225 50	<i>Prince Edward Island.</i>	
Chatham.....	984 60	Charlottetown.....	361 18
Dalhousie.....	551 60	Summerside.....	70 60
Moncton.....	1,069 90	Total.....	431 78
Newcastle.....	547 88		
Sackville.....	191 94	<i>British Columbia.</i>	
St. John.....	8,010 00	Nanaimo.....	3,002 52
St. Stephen.....	137 28	New Westminster.....	119 60
Total.....	11,938 38	Vancouver.....	1,792 38
		Victoria.....	6,279 44
<i>Nova Scotia.</i>		Total.....	11,193 94
Amherst.....	417 64	Total.....	62,243 23
Annapolis.....	188 74	LESS—Refunds.....	464 94
Arichat.....	55 66	Grand total.....	61,778 29
Antigonish.....	11 76		
Baddeck.....	20 52		
Barrington.....	10 02		
Canso.....	239 30		
Digby.....	176 56		
Halifax.....	10,043 02		
Kentville.....	55 80		

APPENDIX

STATEMENT of Expenditure by the Marine Department

	1868.	1869.	1870.	1871.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Maintenance of lights -				
Above Montreal.....	40,561 28	42,306 69	46,289 05	44,054 01
Montreal District	23,053 56	25,762 54	21,669 49	22,453 52
Below Quebec.....	45,615 35	41,651 73	43,730 61	31,582 75
Nova Scotia.....	46,460 72	56,394 88	43,682 86	76,230 77
New Brunswick	20,488 00	23,893 00	27,485 14	20,542 29
Prince Edward Island.....				
British Columbia.....				
Construction—				
Above Montreal.....	3,136 15		2,976 83	8,770 55
Quebec	7,323 75	7,492 59	1,543 06	
Nova Scotia.....	22,041 42	6,905 80	18,967 23	10,948 31
New Brunswick.....			11,555 91	8,735 73
Prince Edward Island				
British Columbia.....				
Dominion steamers—				
Quebec.....	69,026 73	37,176 02	34,549 49	59,797 05
Nova Scotia.....	14,778 92	26,603 94	19,759 96	13,139 86
New Brunswick.....				
Prince Edward Island.....				
British Columbia.....				
Examination of masters and mates.....			908 12	1,407 66
Hudson Bay expedition.....				
Investigations into wrecks.....			140 00	
Marine Hospital, Quebec.....	19,977 36	19,221 45	21,618 73	19,823 18
Marine hospitals.....	1,070 86	15,615 71	15,652 62	15,728 93
Meteorological service.....	8,200 00	8,950 00	8,950 00	9,370 82
Registration of Canadian shipping.....				
Removal of obstructions.....			2,350 07	1,000 00
Rewards for saving life.....				
Signal service.....				
Steamboat inspection.....	7,106 93	7,999 00	7,596 96	8,321 00
Survey, Georgian Bay.....				
Water Police, Montreal.....	27,445 35	10,238 71	9,323 31	8,030 00
" Quebec		12,633 59	9,038 62	9,379 73
Civil Government.....	15,083 88	18,064 25	19,401 05	20,220 96
Steam communication—				
Between Quebec and Maritime Provinces.....				
Between Prince Edward Island and Mainland.....				
Purchase of steamer to replace—				
Glendon				
Lady Head.....				
Winter mail service, Prince Edward Island.....				
Tidal observations.....				
Gratuities.....				
Survey, Burrard Inlet.....				
Export cattle trade				
	371,070 56	360,899 90	362,129 1	389,537 12

SESSIONAL PAPER No. 21

No. 17.

from Confederation to June 30, 1904.

1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
57,609 16	61,036 47	60,798 75	71,937 18	68,344 18	65,421 00	73,175 11	74,587 78	65,518 61
22,369 00	31,143 14	20,939 13	15,000 00	12,999 48	15,998 00	15,996 00	14,917 95	16,523 88
41,936 00	65,645 00	102,056 09	110,362 00	98,792 93	89,980 41	96,904 00	93,178 61	96,703 87
67,862 24	100,953 80	114,711 91	114,344 51	143,125 56	128,496 00	132,888 95	120,951 33	116,189 60
23,369 12	29,266 85	53,459 04	60,119 02	62,551 61	50,998 00	58,989 00	57,499 02	61,252 82
.....	.....	3,357 71	12,584 64	13,730 53	11,817 00	16,986 66	12,158 72	15,288 17
.....	13,207 09	18,519 50	15,983 72	17,175 97	15,853 00	18,948 78	15,152 73	15,576 99
6,940 45	18,999 38	24,461 86	14,286 65	13,320 40	16,267 98	7,207 96	11,993 75	13,297 81
57,818 35	39,303 87	41,950 82	19,325 00	24,336 47	12,945 29	12,776 47	4,154 58	7,797 75
34,760 12	90,181 79	51,867 94	43,898 63	42,214 55	25,550 00	13,500 00	17,386 97	7,069 01
9,561 14	16,691 06	31,572 60	8,842 97	17,819 85	7,083 82	12,028 13	22,598 14	4,985 53
.....	.....	.....	.....	11,829 61	17,752 00	2,504 47	2,560 88	6,074 50
.....	.....	4,353 93	8,799 07	8,477 67	29 66	.....	.....	.....
47,500 00	51,758 05	64,490 00	79,043 70	62,971 49	49,987 66	42,683 00	44,972 79	49,318 93
20,999 63	24,999 57	30,008 99	22,992 62	133,826 08	38,739 39	43,027 00	42,016 53	49,438 93
.....	.....	.....	.....	16,241 26	61,782 63	28,933 63	16,332 05	14,429 52
12,115 96	15,984 72	10,555 67	41,796 74	10,156 56	16,095 90	12,193 40	7,460 68	9,733 34
4,312 07	6,466 18	4,520 19	5,696 62	4,672 08	4,050 00	4,249 76	4,250 12	4,253 43
874 00	1,068 89	2,313 31	366 00	466 41	342 65	500 00	1,691 00	676 73
21,000 00	21,000 00	20,456 45	21,994 75	23,795 85	19,965 97	19,987 50	20,791 77	12,991 23
53,536 16	27,150 43	45,986 87	37,111 67	37,155 72	42,449 55	37,487 10	37,445 57	35,040 00
12,618 15	18,830 54	36,700 59	33,580 00	45,560 03	44,871 38	46,050 24	45,706 13	45,554 51
.....	.....	272 30	1,096 46	412 06	842 14	1,435 10	239 26	257 75
.....	.....	450 00	.....	.....	203 00	462 00	305 86	825 00
2,284 32	1,975 13	4,931 78	3,552 86	2,292 20	1,958 55	4,071 00	2,533 10	2,263 15
8,500 00	13,266 00	10,291 58	12,200 00	13,081 86	13,073 01	13,228 38	13,076 46	11,854 34
10,000 00	14,453 87	12,370 86	13,395 00	14,090 00	13,524 29	14,062 00	13,462 74	13,131 06
10,348 00	18,200 00	26,526 66	24,500 00	27,136 68	21,482 08	23,498 06	23,023 26	22,094 48
22,644 52	25,336 04	30,087 23	31,326 18	32,789 18	32,304 12	32,682 50	36,610 19	35,083 95
.....	.....	15,000 00	10,000 00	10,000 00	.....	.....	.....	.....
.....	.....	.....	.....	750 00	.....	.....	.....	.....
.....
.....
.....
.....
.....
.....
518,958 49	706,817 92	845,150 09	844,586 09	970,146 27	820,054 38	786,156 23	755,359 47	723,360 89

STATEMENT of Expenditure by the Marine Department

	1881.	1882.	1883.
	\$ cts.	\$ cts.	\$ cts.
Maintenance of lights -			
Above Montréal.....	65,541 21	71,048 50	70,116 68
Montreal District.....	14,326 36	21,643 05	22,260 32
Below Québec.....	89,781 29	91,098 66	102,784 99
Nova Scotia.....	128,918 59	137,846 15	150,793 17
New Brunswick.....	63,921 90	66,073 00	75,946 92
Prince Edward Island.....	12,997 36	16,985 72	17,907 27
British Columbia.....	17,570 72	17,803 00	18,349 06
Cape Race.....			
Construction			
Above Montreal.....	14,180 02	13,581 00	9,782 27
Quebec.....	7,539 76	3,731 31	9,672 50
Nova Scotia.....	7,757 52	13,355 00	9,422 75
New Brunswick.....	4,578 52	2,253 80	1,022 57
Prince Edward Island.....	8,150 06	3,092 00	1,934 49
British Columbia.....	8,655 39	3,237 90	1,005 26
Queen's Printer.....			
Dominion steamers—			
Quebec.....	64,973 00	44,923 98	45,156 13
Nova Scotia.....	36,700 00	31,049 74	37,841 07
New Brunswick.....			
Prince Edward Island.....	15,139 95	23,911 97	19,680 00
British Columbia.....	11,788 09	8,504 61	25,484 00
Departement.....			
Examinations of masters and mates.....	3,888 41	3,981 00	4,021 20
Hudson's Bay expedition.....			
Investigation into wrecks.....	310 48	863 19	875 64
Marine hospital, Quebec.....	19,964 33	19,938 12	19,998 53
Marine hospitals.....	32,218 94	33,162 45	29,880 78
Meteorological service.....	46,163 54	47,464 07	51,990 25
Registration of Canadian shipping.....	607 43	2,013 28	168 84
Removal of obstruction.....	150 00	1,116 51	35 80
Rewards for saving life.....	1,806 13	2,212 00	2,534 60
Signal service.....			3,365 33
Steamboat inspection.....	12,211 65	14,835 00	16,209 00
Hydrographic surveys.....			77 81
Water Police, Montreal.....	21,953 26	21,994 74	15,798 24
" Quebec.....	13,497 81	20,221 82	22,520 41
Civil Government.....	36,447 50	36,789 46	37,988 39
Steam communication—			
Between Quebec and Maritime Provinces.....			
Between Prince Edward Island and Mainland.....			
Repairs to wharfs.....			
Purchase of steamers to replace—			
Stanley.....			395 55
Glendon.....			
Lady Head.....			
Winter mail service, Prince Edward Island.....			
Tidal observations.....			
Gratuities.....			
Survey, Burrard Inlet.....			
Export cattle trade.....			
Survey, Bay of Quinté.....			
Relief of distressed Canadians.....			
Manning ships.....			
Widow of late A. Warner.....			
McDonald Bros.....			
Parliamentary Returns.....			
Investigating effect of Chicago drainage canal.....			
John McDonald.....			
Longitude, Montreal.....			
Marine biological station.....			
	761,730 62	774,831 53	825,010 82

4-5 EDWARD VII., A. 1905

STATEMENT of Expenditure by the Marine Department

	1892.	1893.	1894.	1895.	1896.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Maintenance of lights—					
Above Montreal.....	87,033 61	87,598 15	78,090 69	82,541 16	87,256 28
Montreal District.....	116,531 27	120,404 19	124,348 80	124,763 81	124,143 66
Below Quebec.....					
Nova Scotia.....	148,815 26	150,445 26	137,339 73	140,977 53	123,234 65
New Brunswick.....	66,886 69	71,079 46	59,917 96	69,654 46	63,018 64
Prince Edward Island.....	17,069 98	16,819 64	15,569 39	17,976 67	17,988 15
British Columbia.....	26,858 68	24,413 27	27,240 77	21,734 18	24,770 44
General account.....					
Construction—					
Above Montreal.....	21,704 05	8,766 62	12,581 15	2,699 40	11,993 84
Quebec.....	809 27	10,097 18	4 743 13	3,004 14	3,300 00
Nova Scotia.....	1,965 16	4,381 24	3,104 77	4,737 03	1,842 94
New Brunswick.....	1,845 35	1,271 15	115 45	1,597 80	200 00
Prince Edward Island.....	1 56		1,604 00		
British Columbia.....	9,478 81	2,958 61	6,356 43	180 83	225 50
General account.....					
Dominion steamers—					
Quebec.....					
Nova Scotia.....					
New Brunswick.....	145,899 61	163,097 46	178,183 97	169,661 64	145,315 28
Prince Edward Island.....					
British Columbia.....					
Naval Schools.....					
Examinations of masters and mates.....	6,363 88	4,116 99	3,745 33	2,757 29	4,062 82
Hudson's Bay expedition.....					
Investigation into wrecks.....	603 21	643 49	850 81	351 15	483 98
Marine hospital, Quebec.....					
Marine hospitals.....	34,166 83	35,757 07	38,403 94	38,589 05	36,682 96
Meteorological service.....	67,138 06	64,165 60	66,440 96	64,588 34	66,600 29
Registration of Canadian shipping.....	462 59	1,476 19	394 00	207 40	517 60
Removal of obstructions.....	2,878 68	1,554 53	202 02	2,217 36	456 38
Rewards for saving life.....	6,398 93	7,432 64	8,014 67	6,591 34	8,004 38
Signal service.....	5,014 42	5,040 58	4,668 93	5,311 74	5,338 76
Steamboat inspection.....	22,736 59	24,386 95	25,961 36	26,385 88	26,321 27
Hydrographic surveys.....	16,451 10	17,542 11	31,461 76	12,653 28	15,099 63
Water Police, Quebec.....	6,161 60	5,436 23			
Civil Government.....	43,195 31	56,477 23	54,988 88	71,373 82	
Repairs to wharfs.....		84 90	1,007 67	824 38	2,644 69
Purchase of steamer Minto.....					
Winter mail service, P. E. I.....	3,309 44	4,376 96	6,497 03	6,138 18	7,779 69
Tidal observations.....	711 59	5,099 17	10,172 61	11,507 24	9,627 45
Gratuities.....			3,261 32		
Survey, Burrard Inlet.....	2,580 45				
Export cattle trade.....	1,411 57	1,711 73	1,350 83	2,268 74	2,887 24
Survey, Bay of Quinté.....		2,085 45			
Relief of distressed Canadians.....				7 30	
Manning ships.....				500 00	746 89
Widow of late A. Warner.....				160 00	
Macdonald Bros.....				4,000 00	
Parliamentary returns.....					291 08
Investigat. effect of Chicago drain. canal.....					2,500 00
John Macdonald.....					200 00
Unforeseen expenses.....					
Marine biological station.....					
New life-saving station, Long Point.....					
Salaries temporary clerks.....					
Steamer to replace Bayfield.....					
Observatory, Sulphur Mountain.....					
Charles Morrison.....					
W. H. Smith.....					
Montreal Pilotage Comr.....					
Wireless Telegraphy.....					
Purchase land for wharf at Halifax, N.S.....					
Charlottetown, P.E.I.....					
Maintenance and construction of Lurcher and Anticosti lightships.....					
Damages awarded merchants for losses re detention of <i>Minto</i> and <i>Stanley</i>					
	861,426 80	898,720 03	905,654 34	895,828 28	793,634 49

from Confederation to June 30, 1904—*Concluded.*

[illegible]

APPENDIX No. 18.

STATEMENT of Steamboat Inspection Dues collected during the Fiscal Year ended
June 30, 1904.

<i>Ontario.</i>		<i>\$</i> cts.	<i>Nova Scotia.</i>		<i>\$</i> cts.
Bridgeburg.....		50 72	Annapolis.....		7 56
Brockville.....		17 92	Digby		17 36
Collingwood.....		8 92	Halifax.....		1,765 60
Cornwall.....		1 84	Kentville.....		540 24
Gananoque.....		4 20	North Sydney.....		100 80
Kingston.....		75 36	Sydney.....		7 04
Morrisburg.....		7 72	Weymouth.....		6 76
Niagara Falls.....		5 64	Windsor.....		18 96
Peterboro'.....		40 12	Yarmouth .. .		5 72
Port Arthur.....		91 28			
Prescott .. .		107 12			2,470 04
St. Catharines.....		101 52			
St. Thomas .. .		182 84	<i>British Columbia.</i>		
Sarnia.....		158 12	Kaslo.....		
Sault Ste. Marie.....		141 88	Nanaimo.....		
Stratford.....		5 88	Nelson.....		
Toronto .. .		39 92	New Westminster.....		
Wallaceburg.....		2 00	Vancouver.....		92 88
Windsor.....		1,584 58	Victoria .. .		1,869 12
		2,630 58			1,962 00
<i>Quebec.</i>			<i>North-west Territories.</i>		
Montreal.....		226 68	Dawson.....		1,255 44
Quebec .. .		93 84	White Horse.....		17 60
Three Rivers.....		29 24			1,273 04
		349 76			
<i>New Brunswick.</i>			Total.....		9,741 34
Chatham... ..		183 96	LESS refunds.....		42 56
St. John... ..		817 44			9,698 78
St. Stephen. . .		54 52	Inspection tow barges.....		30 00
		1,055 92	Fees for engineers' certificates.....		1,090 00
			Grand total.....		10,818 78

APPENDIX No. 19.

STATEMENT giving Names and Stations of Light-keepers, &c., in the Dominion.

ABOVE MONTREAL.

Name.	Station.	Appointed.	Salary.
			\$ ct
Armstrong, John.	Kaministikwia River.	April 28, 1894..	250 00
Alexander, Andrew.	Lamb Island.....	" 26, 1897..	400 00
Armstrong, Robt.....	Richards Landing.....	June 23, 1904..	40 00
Baechler, F.....	South River.....	July 2, 1903..	80 00
Baker, Henry F.....	Clapperton Island	Dec. 2, 1895..	350 00
Boyd, Robert P.....	Cole Shoal.....	April 9, 1884..	250 00
Boyd, Wm. S.....	Griffith Island.....	May 14, 1889..	350 00
Butler, Silas L.....	Port Dover.....	July 15, 1897..	300 00
Baxter, Wm. I.....	Brebeuf Range.....	Nov. 23, 1885..	375 00
Boucher, François.	Aylmer Island.....	" 17, 1882..	175 00
Bamford, Robert.....	Bamford Island.....	June 21, 1888..	250 00
Bertrand, Félix.....	Coulonge Lake.....	April 2, 1892..	100 00
Boyd, Wm. M.....	Kagawong.....	" 13, 1893..	72 00
Boyter, A. B.....	Narrow Island.....	Jan. 3, 1898..	250 00
Boyter, David.....	Little Current.. ..	April 22, 1902..	350 00
Brown, Adam	Red Rock, Parry Sound	May 25, 1899..	450 00
Brown, James.....	Southampton Harbour.. ..	June 29, 1904..	150 00
Ball, J. H.....	Mississagi Strait, Light and Fog Alarm.....	May 7, 1900..	600 00
Black, W. H.....	Kingsville Range.	July 27, 1902..	150 00
Borron, Mrs. E. B.....	French river Range.....	Jan. 30, 1903..	500 00
Burmister, John F.	Nottawasaga Island.....	May 2, 1904..	500 00
Campbell, Thos.	Burlington Bay Lights.. ..	April 1, 1875..	350 00
Collins, Allen.....	Christian Island.....	Mar. 25, 1891..	435 00
Cross, Manly R.....	Gananoque Narrow and Jack Straw Shoal Light	Aug. 25, 1896 ..	480 00
Campbell, Robert.....	Goderich.....	June 9, 1886 ..	400 00
Craig, Wm.....	Thunder Cape.....	May 17, 1892..	600 00
Cook, Seldon B.	Long Point Light and Fog Alarm.....	June 9, 1897..	700 00
Campbell, John.	McTavish Point.....	Nov. 18, 1896 ..	100 00
Crevier, Dolphis	Pointe Claire	May 11, 1888..	200 00
Cartier, H. J.....	Thames River.....	Oct. 19, 1884..	425 00
Cooper, John.....	Port Arthur.....	" 14, 1882..	300 00
Cosgrove, George.....	Victoria Island, Lake Superior.....	Nov. 14, 1889..	350 00
Columbus, Christopher ..	Penetanguishene and Whiskey Island.....	Mar. 18, 1893..	400 00
Conover, Forrest H. C....	Leamington.....	April 24, 1883..	150 00
Cox, John.....	Morrison or Hawley Island.....	June 22, 1887..	100 00
Chabot, Joseph.....	Papineauville Range.....	" 17, 1897..	100 00
Connors, Frank.....	Point Pleasant.....	Oct. 13, 1898 ..	200 00
Chase, H. J.....	Weller Bay.....	Nov. 4, 1898..	150 00
Casgrain, Mrs. Kate	Glengarry or Stonehouse Point Light.....	May 29, 1903..	36 00
Currie, Archibald.....	Tobermory.....	Oct. 12, 1903..	250 00
Cowan, Thos. M.....	Stag Island Shoal.....	Nov. 3, 1903..	150 00
Chapman, Richard.....	Cape Croker Lt and Fog Alarm.....	" 13, 1902..	650 00
Clark, jr., H.....	Port Colborne Light and Fog Alarm	May 30, 1904..	600 00
Currie, Hector.....	Flowerpot Island.....	..... 1904..	300 00
Davieau, Joseph.....	Corbay Point.....	May 27, 1890..	350 00
Durnan, George.....	Gibraltar Point Light and Fog Alarm.	" 31, 1854..	625 00
Davieau, Hyacinthe.	Michipicoten Island.....	July 1, 1881..	400 00
Doaust, Dosithée.....	McKie Point.....	Sept. 21, 1893..	175 00
Davis, John H.....	Pigeon Island.....	May 16, 1896..	350 00
Dick, Andrew	Porphyry Point.....	Aug. 10, 1880..	400 00
Dutcher, Samuel.....	Meaford.....	May 7, 1877..	150 00
Darling, Thomas.....	Southeast Bay.....	Jan. 31, 1891..	60 00
Dixon Joseph G.....	Rosseau.....	July 21, 1890 ..	100 00

STATEMENT giving Names and Stations of Light-keepers, &c.—Continued.
ABOVE MONTREAL—Continued.

Name.	Station.	Appointed.	Salary.
			\$ cts.
Deault, Alphonse.....	Beauharnois Lights.....	April 14, 1903..	*200 00
Demers, Wilbrod.....	Caribou Island Light and Fog Alarm.....	May 10, 1899..	1,000 00
Dulmage, Dorland.....	Outer Drake or False Ducks.....	" 19, 1903..	350 00
Ead, Mrs. C.....	Port Stanley	" 15, 1890..	300 00
Felan, Maurice	Oakville.....	April 28, 1894..	150 00
Fortier, David H. A. ...	Port Colborne Range Lights and Fog Alarm...	" 11, 1865..	550 00
Fellowes, W. R.....	Rondeau Harbour.....	Dec. 18, 1888..	*350 00
Filiatreault, Thomas	Coteau Landing.....	May 27, 1890..	140 00
Fjeldsted, T	Gull Harbour, Lake Winnipeg.....	" 6, 1904..	150 00
Gloude, Benjamin.....	Dorval.....	Sept. 7, 1872..	300 00
Gillespie, Wm.....	Wolfe Island.....	Mar. 16, 1885..	250 00
Gauthier, Charles.....	St. Placide.....	May 1, 1874..	140 00
Gordon, Robert.....	Cobourg.....	" 16, 1883..	180 00
Griffith, Alfred H.....	Giant Tomb.....	Sept. 17, 1898..	250 00
Gourley, John, jr.....	Manitowaning.....	July 3, 1900..	150 00
Gilbert, Philip.....	Warton Pole Light.....	Sept. 5, 1902..	75 00
Graham, W.....	Graham, Ottawa River, Que.....	" 5, 1904..	75 00
Hackett, Mrs. A.....	Bois Blanc.....	June 27, 1901..	435 00
Hill, Thomas H.....	Lancaster	Aug. 27, 1877..	325 00
Haitze, Jean.....	Lonely Island.....	May 11, 1885..	450 00
Hunter, David.....	Port Dalhousie	Oct. 29, 1879..	350 00
Hawkins, David B.....	Peninsula Harbour	Aug. 31, 1891..	500 00
Harvey, James.....	Thessalon.....	Nov. 22, 1897..	300 00
Hamilton, Thos.....	Pie Island	April 15, 1899..	75 00
Humes, David.....	Stribling Point Range.....	Aug. 27, 1902..	180 00
Hendrickson, Mrs.....	Sulphur Island	June 18, 1901..	325 00
Hughes, Wm.....	Red River, Man.....	Feb. 12, 1892..	350 00
Johnson, Isaac S.....	Cherry Island.....	Nov. 5, 1883..	300 00
Jeffrey, Carson.....	Nigger Island Shoal.....	April 28, 1894..	200 00
Kingston City Clock.....	Corporation of Kingston	—, 1844..	†100 00
King, Peter.....	Slate Island Light.....	Nov. 17, 1903..	400 00
Knapp, Charles.....	Lion's Head Whf. Lt.....	Oct. 28, 1903..	75 00
Lambert, Wm. McGregor.	Chantry Island and Light on Breakwater at Southampton	Oct. 1, 1880..	500 00
Labelle, Louis.....	Deep River Islet.....	May 5, 1897..	100 00
Lamorandière, Pierre Régis de.....	Killarney Lights	Sept. 24, 1880..	400 00
Léger, Thomas.....	Lower End Lake St. Louis Lights and Lightships	1904..	††50 00
Lamondin, Louis.....	Gereauy Island	July 30, 1901..	250 00
Lowe, Robert.....	Thornbury	April 12, 1897..	80 00
Lowry, Robert M.....	Port Elgin.....	Mar. 14, 1896..	80 00
Lumsden, A. C.....	Lake Timiskaming Lights	Oct. 6, 1899..	250 00
Lidwill, John R.....	Pelee Island.....	July 10, 1899..	300 00
Lawson, Frank.....	Middle Island	—, 1904..	240 00
Lacroix, H.....	Oka	Nov. —, 1898..	150 00
Laberge, Albert.....	Green Shoal	May 20, 1902..	200 00
Leblanc, J. B.....	Lower Narrows	Jan. 4, 1904..	100 00
Lunan, J. W.....	Collingwood.....	" 2, 1904..	250 00
Langlois, L.....	Middle Ground, Pelee Passage.....	Feb. 25, 1904..	500 00
Manson, Wm. A.....	Pelee Passage, Lake Erie, Light and Steam Siren	Nov. 11, 1902..	600 00
Munroe, John Jacob.....	Lancaster Bar	June 8, 1892..	300 00
Masson, Lucas H.....	Point aux Anglais.....	Sept. 4, 1897..	300 00
Mongeon, Charles A.....	Way Shoal	May 23, 1887..	160 00
Matheson, Norman	Cape Robert, Algoma	Oct. 7, 1896..	350 00
Miller, John.....	Port Crédit.....	Dec. 16, 1897..	150 00
Morrisseau, Jonathan.....	Ferris Island	Mar. 24, 1898..	150 00

* An additional \$20 per month during winter when light in operation. † Allowance of \$3.50 per 1,000 ft. for gas. ‡ During season of navigation.

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Light-keepers, &c.—*Continued.*

ABOVE MONTREAL—*Continued.*

Name.	Station.	Appointed.	Salary.
			\$ cts.
Matheson, Angus	Gore Bay	July 10, 1903..	350 00
Manson, John	Colchester Reef	May 1, 1880..	600 00
Martin, Wm. J.	Boyd Island	July 5, 1890..	250 00
Miron, Louis.....	Gargantua	Oct. 26, 1899..	450 00
Murray William.....	Barrifield Range	May 17, 1900..	150 00
Montgomery, William	Toronto East Pier	Oct. 16, 1895..	300 00
Mason, F. E.	West End of Long Point.....	June 3, 1901..	400 00
Manders, Samuel.....	Lower Allumette Lake.....	July 26, 1901..	100 00
Martin, Edward.....	Michael Point	June 3, 1902..	120 00
Michigan Land & Lumber Co.....	Blind River	Sept. 8, 1900..	80 00
Masters, Fred	Niagara-on-the-Lake Fog Alarm .....	..... 1904..	400 00
McKillop, John.....	Campbell Island.....	April 2, 1892..	150 00
McIntosh, John	Amprior Island.....	" 2, 1892..	150 00
Matheson, Daniel.....	Black Bear Island, Lake Winnipeg.....	June 22, 1899..	200 00
McKenzie, John	Presqu'Isle, Owen Sound, Georgian Bay....	July 14, 1873..	100 00
McDonald, Murdock	Point Clark.....	Jan. 8, 1897..	400 00
McDonald, Amos.....	Salmon or Wrecked Point	July 12, 1897..	300 00
McKillop, Donald	St. Anicet.....	June 8, 1892..	230 00
McLaren, Allen J.....	Brown or Knapp Point.. ..	Feb. 11, 1896..	180 00
McKay, Chas. S.....	Battle Island.....	Aug. 27, 1877..	500 00
McKenzie, Wm	Strawberry Island.....	May 17, 1893..	300 00
McLeod, Mrs. E.....	McQuestion Point.....	Feb. 22, 1904..	100 00
McAulay, Donald.....	Saugeen.....	Mar. 16, 1899..	120 00
McDonald, Lauchlin D.....	Mississagi Island.....	May 16, 1896..	450 00
McCool, James.....	Fort William Beacon Light, Ottawa River	" 23, 1887..	90 00
McDevitt, Chas.....	Point au Baril.....	March 1, 1897..	300 00
McKay, John.....	Lyal Island.....	Oct. 27, 1884..	450 00
McLean, Arch.....	Owen Sound.....	Dec. 23, 1897..	126 00
McGaw, Thos	Kincardine.....	June 13, 1899..	400 00
McDougall, Neil.....	Squaw Island	April 25, 1901..	200 00
McKinnon, A	Point aux Pins.....	May 16, 1904..	400 00
McLeod, Kenneth	Cove Island	June 19, 1903..	750 00
McMenemy, Robt	Otter Island.....	Nov. 17, 1903..	400 00
McMaster, And.....	Nine Mile Point Fog Alarm	April 1, 1900..	200 00
McPherson, Geo.....	Bishops Bay	Mar. 28, 1904..	150 00
Ouelette, Godfrey.....	Buckom Point	Feb. 23, 1884..	200 00
O'Connor, P.....	Rainy River	June 23, 1904..	250 00
O'Brien, Wm.....	Pickering.....	April 14, 1904..	125 00
Ottawa Electric Light Co.....	Britannia .....	..... 1904..	150 00
Purvis, John.....	Great Duck Island Light and Fog Alarm	March 9, 1898..	700 00
Pettypiece, Stephen.....	Line Kiln Crossing	May 11, 1888..	350 00
Prosser, John.....	Fox Island	Sept. 14, 1896..	250 00
Proudfoot, Thos.....	EastNeebish, Upper Range	Nov. 4, 1898..	100 00
Poirier, Siméon.....	Point à Cadieux	May 4, 1904..	150 00
Port Darlington Co.....	Darlington.....	.....	100 00
Plunkett, H. E.....	Plunkett Island, Lake Winnipeg.....	Oct. 12, 1884..	350 00
Rathbun Co.....	Deseronto.....	Oct. 14, 1884..	260 00
Root, Albert.....	Grenadier Island.....	Dec. 15, 1863..	250 00
Roddick, Robert.....	Peter Rock, or Gull Island.....	Mar. 23, 1872..	500 00
Rowe, Geo. Albert.....	Telegraph Island	Oct. 25, 1895..	200 00
Robillard, Honoré.....	Isle Perrot	Jan. 25, 1897..	100 00
Redmond, William H.....	Gravenhurst Narrows.....	June 18, 1894..	100 00
Rains, Evan.....	Shoal Point, Algoma.....	Nov. 24, 1884..	250 00
Rains, A. M.....	Sailors' Encampment.....	Aug. 1892..	64 00
Rains, W. W.....	Rains Wharf Range	" 1892..	*7 00
Ritchie, John A.....	South Bay Mouth.....	Sept. 10, 1903..	150 00
Rowan, James.....	Morris or Victoria Island.....	Dec. 3, 1898..	120 00
Richardson, Wm. T.....	Michipicoten Hr., Algoma.....	Sept. 27, 1900..	200 00
Richardson, Thos, J.....	Western Islands Light and Fog Alarm	June 27, 1901..	800 00
Richmond, John A.....	Snug Harbour Range.....	Oct. 7, 1902..	350 00
Roussain, J. J.....	Providence Bay.....	June 27, 1904..	250 00
Rogue, Frank.....	Killarney Lights.....	May 14, 1904..	300 00

* Per month while light in operation.

4-5 EDWARD VII., A. 1905

STATEMENT giving Names and Stations of Light-keepers, &c.—*Continued.*ABOVE MONTREAL—*Concluded.*

Name.	Station.	Appointed.	Salary.
			\$ cts.
Sommers, Napoleon.....	Midland Point Range.....	June 19, 1900..	150 00
Shannon, William.....	Grosse Point or Valleyfield.....	Sept. 27, 1866..	425 00
Shannon, George.....	" "	" 27, 1866..	175 00
Seguin, Grégoire.....	L'Orignal.....	May 8, 1894..	100 00
Shaw, Thos. K.....	Point Edward Range.....	Aug. 29, 1903..	150 00
Smethers, R. O.....	Mohawk Island.....	Mar. 31, 1896..	400 00
Sutherland, Jno.....	Port Burwell.....	June 18, 1894..	225 00
Schofield, Fergus.....	Port Maitland.....	April 10, 1871..	350 00
Simpson, Hedley V.....	Brighton Ranges..	May 11, 1888..	540 00
Smith, H. E.....	Presqu'Isle.....	April 29, 1898..	350 00
Sullivan, Silas.....	Baskins Wharf.....	Dec. 22, 1896..	130 00
Sauvé, Honoré.....	Caron Point.....	Feb. 16, 1889..	60 00
Stoneburner, John A.....	Dickinson Landing.....	April 12, 1890..	100 00
Spencer, C. R.....	Scotch Bonnet.....	" 27, 1903..	350 00
Scott, Guy J.....	Point Peter, Light and Fog Alarm.....	June 6, 1901..	650 00
Scott, Wm. J.....	Corunna Range.....	April 23, 1901..	120 00
Stocker, Jos. L.....	Ste. Anne de Bellevue.....	May 20, 1902..	150 00
Sweeney, Thomas.....	Tomahawk Island.....	Sept. 19, 1902..	150 00
Taylor, Edward.....	Parry Sound Range Lights.....	June 3, 1901..	550 00
Tebo, Joseph.....	North Sister Rock.....	May 20, 1902..	350 00
Veech, Stannes.....	Nine Mile Point light.....	Mar. 7, 1894..	450 00
Vallée, Charles.....	Hope Island.....	April 20, 1899..	450 00
Vorce, Marcellus.....	South Bay point.....	Nov. 21, 1902..	200 00
Webster, Chas.....	Cabot Head, Light and Fog Alarm..	May 10, 1898..	650 00
Whitmarsh, John.....	Snake Island.....	July 18, 1900..	350 00
Weir, John C.....	Belleville.....	April 4, 1901..	200 00
Wemp, Daniel.....	Centre Brother Island.....	Jan. 9, 1901..	200 00

BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC.

Abel, Philias ...	Barre à Boulard, Back Range.....	June 23, 1903..	75 00
Arcand, Elzéar	Cap de la Magdeleine.....	May 17, 1892..	80 00
Arcand, Alfred.....	Seven Islands, Light and Explosive Signal Station.....	" 20, 1898..	650 00
Ascah, James.....	Fame Point, Gaspé, Light and Fog Alarm.....	Sept. 2, 1880..	700 00
Arseneau, Nectaire.....	Etang du Nord.....	July 21, 1891..	350 00
Arpin, Joseph	Contrecoeur Course, Front Light.....	April 22, 1904..	100 00
Bertrand, Louis	Champlain, Back Pole Light.....	Sept. 12, 1902..	60 00
Beaudet, Mrs. Laurent.....	Lotbinière Front Light.....	" 3, 1903..	80 00
Beaudet, George.....	Lotbinière Back Light.....	Jan. 4, 1883..	80 00
Beaudet, Charles.....	Platon Range.....	Aug. 24, 1894..	120 00
Bourque, Peter	Bird Rocks, Light & Explosive Signal Station.....	Nov. 27, 1896..	1,200 00
Bouilliane, Pierre.....	Lark Islet Light and Fog Alarm.....	Sept. 1, 1872..	400 00
Bertrand, Auguste.....	Macquereau Point.....	Dec. 21, 1877..	*300 00
Banville, Joseph.....	Matane Lights.....	Feb. 1, 1897..	300 00
Bourget, F.....	Percé.....	Mar. 18, 1893..	200 00
Breton, Narcisse.....	Rich Point.....	May 16, 1896..	500 00
Bourget, Charles.....	Cape Despair.....	Nov. 1, 1897..	†400 00
Bisson, Wm.....	Grand River.....	Oct. 22, 1896..	‡150 00
Bouchard, Louis.....	Cape Salmon, Light and Fog Alarm.....	May 16, 1896..	600 00
Boucher, Louis	Isle aux Raisins.....	April 13, 1898..	240 00
Boulanger, H.....	St. Thomas Wharf and Back Range Light.....	" 4, 1898..	80 00
Bujold, Louis.....	Carleton.....	May 25, 1899..	300 00
Boisvert, Alcide	Cape Charles, Front Light.....	July 23, 1901..	150 00
Baron, Amédée.....	Cape Charles, Upper Back Light.....	June 26, 1901..	70 00
Bouchard, George.....	St. Irenée.....	Aug. 31, 1901..	††40 00
Bousquet, Felix.....	Verchères Village (Back).....	April 21, 1902..	70 00

*Allowance \$20 per annum for blowing fog horn; \$10 per annum for keeping road in repair.
†Allowance \$30 per annum for blowing fog horn. ‡Allowance \$20 per annum for blowing fog horn.
††Per season of navigation.

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Light-keepers, &c.—Continued.

BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC—Continued.

Name.	Station.	Appointed.	Salary.
			\$ cts.
Bilodeau, Joseph O	Bellechasse.....	June 15, 1903..	320 00
Bergeron, Nap.....	St. Antoine, Lotbinière Front Light	Mar. 21, 1902..	80 00
Bordua, Phileas.....	Ile Deslauriers, Front Light.....	April 21, 1902..	120 00
Bourdages, Pitre.....	Point Eschourie.....	July 25, 1903..	60 00
Boulliane, J. E.....	Point Noire Range Lights	Jan. 18, 1904..	200 00
Blanchet, J. G.....	Father Point, Fog Alarm.....	1904..	800 00
Brown, Charles.....	Pointe à-la-garde, Lightship.....	1904..	300 00
Carignan, P. L.....	Champlain Main Light.....	Oct. 1, 1902..	80 00
Cornier, Wm.....	Amherst Island.....	April 26, 1871..	350 00
Colton, P. J.....	Belle Isle, Light and Fog Alarm.....	Jan. 30, 1902..	*1,100 00
Côté, Luc.....	Cape Chat.....	Dec. 3, 1901..	**500 00
Campbell, John W.....	Cape Norman, Light and Fog Alarm.....	April 12, 1890..	720 00
Costin, Eugène.....	Cape Rosier, Light and Fog Alarm.....	Nov. 4, 1890..	800 00
Chamberlain, H.....	Oak Point, Range Lights.....	April 19, 1900..	100 00
Collins, Geo. F.....	Entry Island, Magdalen Islands.....	Feb. 28, 1901..	250 00
Chenel, John A.....	Grand Entry	July 4, 1901..	50 00
Chiasson, Edward.....	Etang du Nord.....	Oct. 22, 1896..	350 00
Croteau, Télesphore.....	Ste. Croix, Front Range.....	Mar. 28, 1901..	70 00
Chicoine, Alphonse.....	Isle Bouchard, Back Light.....	April 23, 1902..	80 00
Chicoine, F. Xav.....	Verchères Traverse, Front Light.....	" 21, 1902..	80 00
Charbonneau, Philéas.....	" Back Light.....	" 21, 1802..	70 00
Charest, Xavier.....	Flower Island	Oct. 10, 1903..	600 00
Comtois, Joseph.....	Isle Ste. Thérèse, Back Light.....	Feb. 11, 1903..	80 00
Carrière, H.....	Boucherville, Isle St. Joseph.....	Aug. 26, 1903..	80 00
Caisse, Louis	Petite Traverse, Contrecoeur, Front Light.....	April 22, 1904..	100 00
Caron, Alphonse	Lower Traverse, Light and Fog Alarm.....	—, 1903..	4 00 p. diem
Coulombe, M.....	Chlorydormes	—, 1904..	100 00
Chartier, Adolphe	Hochelaga Lights, Montreal Harbour	—, 1904..	300 00
Couillard, A.....	East Point, Anticosti, Lightship.....	May 27, 1904..	||1,000 00
Chisholm, John.....	New Carlisle, Wharf Light.....	Aug. 1, 1903..	.....
Desmarais, Philéas.....	River St. Francis.....	July 2, 1897..	†20 00
Duperie, Alfred J.	Pointe aux Jones.....	May —, 1873..	40 00
Demers, Antonio.....	Pointe à Basile, Back Light.....	—, 1904..	130 00
Donville, Elzéar.....	" Front Light	Feb. 6, 1901..	130 00
Doré, François.....	St. Antoine, Lotbinière, Back Lights.. ..	Mar. 21, 1902..	130 00
Dubois, Louis.....	Isle à la Bague.....	April 14, 1903..	150 00
Dubois, Octave.....	Greenly Island, Light and Fog Alarm.....	Oct. 12, 1903..	800 00
Ducharme, Jos.....	St. Ours, Traverse.....	April 18, 1904..	100 00
Duval, Norbert.....	Contrecoeur Course, Back Light.....	" 22, 1904..	100 00
Daigle, Nap	Barre à Boulard, Front Range.....	May 28, 1904..	150 00
Electric Light Company of Roberval	Roberval Beacon Lights.....	June 21, 1898..	60 00
Fournier, Alfred	Upper Traverse.....	April 14, 1900..	600 00
Fugère, Léandre	Batiscan, Front Light	" 19, 1868..	80 00
Fugère, Napoleon.....	" Back Light.....	Jan. 10, 1887..	80 00
Fiset, Jean H.....	Lake St. Peter, Lightship No. 2.....	April 22, 1875..	500 00
Fontaine, Edouard.....	Cape Bauld, Lighthouse and Fog Alarm.....	Nov. 1, 1892..	†800 00
Faffard, Victor.....	Point de Monts, Light & Explosive Signal Sta.	Aug. 1, 1889..	††550 00
Fraser, Pierre T	Red Islet.....	April 12, 1890..	\$450 00
Ferland, Nap.....	Ste. Petronille.....	Sept. 3, 1901..	150 00
Fletcher, James.....	Longue Pointe, Traverse.....	May 16, 1904..	125 00
Fournier, Arthur	Grande Vallée.....	—, 1904..	100 00
Geoffrion, Azarie.....	Varenes.....	May 1, 1903..	70 00
Giguère, Denis.....	Lavaltrie	" 24, 1870..	300 00
Gauthier, François.....	Poste St. Martin, Front Light.....	" 1872..	40 00
Grenier, Solomon.....	Newport Point.....	June 3, 1897..	150 00
Guyon, Joseph	Verchères Village, Front Light.....	April 21, 1902..	80 00
Gilbert, F. E.	Rivière du Loup, Wharf Light	Sept. 22, 1902..	70 00

* Allowance \$100 per annum for horse keep. ** Allowance \$25 per annum for hauling supplies. || With a crew for the vessel paid by Department. †Per month during season of navigation. †† Allowance of \$75 per annum for horse keep. ‡ Allowance of \$50 per annum for horse keep. § Allowance of \$50 per annum for water, &c.

STATEMENT giving Names and Stations of Light-keepers, &c.—*Continued.*
BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC—*Continued.*

Name.	Station.	Appointed.	Salary.	
			\$	cts.
Gagné, François.....	L'Ange Gardien, Island Orleans, Front Light..	Nov. 10, 1902..	70	00
Granier, Henri.....	Bersimis, Range Lights	Aug. 8, 1903..	100	00
Goudreault, Wm.....	Isle au Belier, Lake St. John	Oct. 30, 1901..	75	00
Girard, Henry.....	Murray Bay	July 13, 1903..	50	00
Godbout, Joachim	St. Laurent, Island of Orleans.....	April 15, 1904..	300	00
Guyon, Ernest	Contrecœur and Verchères Range, Back Light..	— —, 1904..	125	00
Hébert, Moïse Manuel dit.	Cap de la Magdeleine.....	May 11, 1888..	80	00
Harvey, André	Chicoutimi Wharf.	" 30, 1889..	40	00
Houde, Emile.....	Grondines Point Range, Back Light.....	June 20, 1904..	100	00
Irvine, John T. A.	Red Island Lightship and Fog Whistle.....	Mar. 2, 1900..	*500	00
Kennedy, Thomas.....	Sandy Beach	— —, 1904..	300	00
Lafèche, Désiré.	Lake St. Peter Lightship No. 1	April 12, 1887..	450	00
Lachapelle, Jean B.	Repentigny, Front Light.. ..	Feb. 1, 1861..	75	00
Langlois, Antoine.....	River du Chêne	July 11, 1888..	125	00
Laliberté, Arthur.....	Ste. Emilie, Front Range.....	Sept. 24, 1880..	90	00
Lord, Joseph	North of Halfway Point Range.....	May 5, 1903..	170	00
Laporte, Ivon	Ile Marie, Isle Bouchard Front Range.....	April 21, 1902..	120	00
Lapointe, F.-X.....	Isle à l'Aigle, Front Range.....	May 1, 1903..	100	00
Leclerc, P. M.....	Ste. Emilie, Back Range.....	April 8, 1899..	80	00
Lavoie, M.....	Rivière Valin Range.....	— —, 1893..	70	00
LeHuguet, François.....	Cape Gaspé Light and Explosive Signal Station	Oct. 22, 1896..	650	00
Lindsay, Wm.....	Gaspé Wharf Light	June 14, 1900..	42	00
Lindsay, Irénée.....	Green Island Light and Explosive Signal Station	Sept. 25, 1888..	650	00
Loisel, John	Paspébiac	Aug. 27, 1894..	†150	00
LeBlanc, Régis.....	White Island Reef Light-ship and Fog Whistle	Jan. 11, 1878..	‡500	00
Lemieux, Z.....	South-west Point, Anticosti	July 10, 1900..	§600	00
Lachance, Louis.....	St. John, Island of Orleans.	Sept. 26, 1896..	300	00
Leclerc, Geo.....	Pillars and Algernon Rock Lights	July 30, 1901..	650	00
Lavoie, F.....	Anse St. Jean Wharf Light	Mar. 13, 1889..	40	00
Levesque, Arthur.....	Grosse Isle, Kamouraska.....	Feb. 19, 1901..	400	00
Leclerc, Auguste.....	Martin River	Sept. 3, 1902..	300	00
Lemieux, F. X.....	Barachois de Malbaie	Mar. 6, 1903..	60	00
Laprise, Emile	Anticosti South Point Light and Fog Alarm..	April 18, 1903..	800	00
Levesque, Dom.	Pointe aux Origneaux	Oct, 5, 1903..	350	00
Lepage Joseph	St. Francis, Islands of Orleans, Front Light..	April 20, 1876..	75	00
Lacroix, Frs. Joseph.....	Contrecœur Traverse, Front Light	April 14, 1904..	75	00
Lacroix, Alfred.....	" " Back Light.....	— —, 1904..	100	00
Laporte, J. B.....	St. Ours Traverse Front Light.....	— —, 1904..	125	00
Lefrançois, H.....	Ste. Anne des Monts.....	— —, 1904..	100	00
Letourneau, Louis	Mont Louis	— —, 1904..	100	00
Label, Esdras.....	Lower Traverse Lightship.....	April 21, 1900..	2,300	00
Manseau, François	Port St. Francis	Mar. 27, 1900..	240	00
Montplaisir, Dom.....	Cap de la Magdeleine	— —, 1904..	175	00
Malo, Joseph.....	Isle Ste. Thérèse, Lower Range.....	Feb. 1, 1897..	130	00
Marchand, Ferdinand.. .	Citrouille Point.....	April 27, 1896..	200	00
Martin, Paul	St. Valentine	April 28, 1873..	150	00
Molson, Mrs. Alexander..	Molson's Island, Lake Memphremagog.....	From year to year	**2	50
Malouin, Alfred	Anticosti, West Point	July 1, 1877..	††750	00
Martin, Jules G.....	Little Metis	Dec. 23, 1879..	††300	00
Marceau, Louis.....	St. Francis, Island of Orleans, Back Light..	April 1, 1884..	75	00
Mayrand, Eugène.....	Grondines, Upper Range, Front Light.....	June 20, 1904..	125	00
Morin, Hypolite.....	Long Pilgrim	April 29, 1898..	§§340	00
Marcotte, Mrs. P. L.....	Point Blene, Lake St. John	Nov. 28, 1898..	40	00
Morin, Alex.....	Rivière à la Pipe.....	Oct. 3, 1901..	50	00
Morin, Alfred	Anse aux Griffons	— —, 1904..	100	00

* Allowance of \$1,900 per annum for assistance of engineer and necessary crew. † Allowance, \$30 per annum for blowing foghorn. ‡ Allowance \$2,300 per annum for assistance of Engineer and necessary crew. § Allowance \$50 per annum for horse keep. ** Per week during season of navigation. †† Allowance of \$50 per annum for horse keep. ‡‡ Allowance of \$40 per annum for water. §§ Allowance of \$68 per annum for water, &c.

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Light-keepers, &c.—*Continued.*

BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC—*Continued.*

Name.	Station.	Appointed.	Salary.
			\$ cts.
McGee, Jas. A.....	Ash and Bloody Island	May 26, 1903..	200 00
McWilliam, John J.....	Father Point Light	June 1, 1876 ..	*450 00
McLaren, Donald.....	River du Moulin.....	Sept. 19, 1889..	40 00
McInnis, George.....	Port Daniel.....	Oct. 7, 1902..	60 00
Paré, Olivier	L'Ange Gardien, Island of Orleans, Back Light.	Nov. 10, 1902..	70 00
Pelletier, Tancrede.....	Egg Island	July 1, 1901..	500 00
Paquin, Sylva	Pointe du Lac.....	May 2, 1900..	100 00
Paul, Edouard	Isle de Grâce	Sept. 7, 1871..	240 00
Page, Siméon.....	L'Islet Richelieu.....	—, 1904..	150 00
Peters, D. E.....	Witch Shoal, Lake Memphremagog.....	Oct. 31, 1904..	†4 50
Peters, J. H.....	Black Point.....	From year to year	†1 50
Patterson, J. A.....	Wadleigh Point.....	" "	†1 50
Paquet, Pierre.....	Ste. Famille, Island of Orleans, Back Light ..	Oct. 19, 1885..	70 00
Pednault, Pierre.....	Isle aux Coudres, Wharf	April 14, 1896..	40 00
Poulin, Alfred.....	Ste. Famille, Island of Orleans, Front Light ..	April 26, 1898..	70 00
Pineault, Louis	Bicquette Island Light and Fog Alarm.....	Oct. 6, 1900..	700 00
Perrault, Henri.....	St. Pierre les Becquets	May 26, 1901..	70 00
Pilote, Auguste.....	Poste St. Martin, Back Light.....	.....	40 00
Quinn, Thos.....	Georgeville wharf light.....	May 23, 1902..	†1 50
Reeves, Samuel	Ile Ste. Thérèse, Upper Range	Oct. 12, 1870..	270 00
Richelieu and Ontario Nav- igation Co	Sorel wharf lights.....	.....	85 00
Rivet, Léon L.	Repentigny, Back Light	April 28, 1894..	75 00
Richard, Alphonse.....	Brandy Pots	Oct. 7, 1878..	400 00
Rennie, E. H	Cape Ray, Light and Fog Whistle.....	Oct. 19, 1884..	800 00
Roberge, C. Honoré.....	St. Pierre, Island of Orleans, Back Light	Oct. 19, 1885..	70 00
Rodrique, Josephine.	Portneuf	May 16, 1903..	250 00
Racette, Widow of D.....	Ste. Croix Back Range.....	Dec. .. 1900..	70 00
Roy, Charles.....	Belleville Park Lights, Montreal Harbour.....	..... 1904..	300 00
St. Laurent, E.	Petite Traverse Contrecoeur, Back Light	April 22, 1904..	100 00
Salvail, Omer	Isle à la Pierre.....	May 6, 1897..	220 00
Savaria, Eusèbe.....	Isle à l'Aigle, Back Range Light	" 1, 1903..	100 00
Savard, Dorilas.....	Savards Range.....	.....	70 00
Simard, Edouard.....	Montée du Lac, and Cape Rouge Beacons.	Oct. 28, 1870..	400 00
Sasseville, F. J.....,	Cape Magdalen, Light and Fog Whistle.....	June 9, 1886..	700 00
Ste. Croix, George.....	Point Peter.....	Oct. 22, 1896 ..	450 00
Savard, Jno.....	River Caribou Front Light.....	Aug. .. 1898..	40 00
Simard, H.....	" Back Light.....	.....	40 00
Sauvageau, Charles.....	Grondines Point Range, Front Light.....	June 20, 1904..	250 00
Sauvageau, Jos.....	Grondines Upper Range, Back Light.....	June 20, 1904..	100 00
Samuel, André	Fox River .....	..... 1904 ..	100 00
Thurber, Mrs. Wm..	Ste. Croix	March 28, 1901..	175 00
Tremblay, W. T.....	Goose Cape.....	April 4, 1888..	250 00
Tremblay, Edmond.....	Portneuf en bas.....	May 16, 1903..	300 00
Tremblay, George.....	River du Moulin.....	Sept. 19, 1889..	40 00
Tremblay, Pitre.....	St. Alphonse Wharf Light.....	June 19, 1895..	40 00
Tremblay, Henry.....	Cap à l'Aigle Wharf Light	Feb. 6, 1896..	40 00
Tremblay, Thomas.....	Bay St. Paul.....	Oct. 25, 1898..	250 00
Tremblay, Alexis.....	Heath or East Point, Anticosti, Light and Ex plosive Signal station	July 25, 1900..	†600 00
Tremblay, Magloire.....	Les Eboulements Wharf Light.....	April 27, 1892..	40 00
Tétreault, Honoré.....	Contrecoeur to Verchères Range, Front Light ..	..... 1904 ..	125 00
Tessier, Armand.	Pointe Bleue	June 9, 1904..	40 00
Thomas, Paul.....	Belle Isle, North End, Light and fog alarm....	..... 1904..	1,100 00
Vigneau, Placide.....	Perroquet Island.....	Sept. 19, 1892..	600 00
Vézina, Oliver.....	St. Pierre, Island Orleans, Front Light.....	Oct. 28, 1897..	70 00
Vézina, Désiré.....	Crane Island	April 26, 1904..	320 00
Whitman, Wm. Gunn	Lacolle.....	Jan. 18, 1904..	150 00

* Allowance of \$10 per annum for water. † Per week during season of navigation. ‡ Allowance \$50 per annum for horse keep.

4-5 EDWARD VII., A. 1905

STATEMENT giving the Names and Stations of Light-keepers, &c.—Continued.
BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC—Concluded.

Name.	Station.	Appointed.	Salary.
			\$ cts.
Wheeler, W.	Lead Mines, Lake Memphremagog	From year to year	*1 50
Wyatt, Thomas M.	Amour Point, Forteau Bay, Light and Fog Alarm	Oct. 18, 1889..	†800 00
Willett, B. V.	New Richmond, Duthie Point	" 16, 1903..	60 00
Weaver, J. B.	Lake St. Peter Light ship No. 3	May 7, 1904..	400 00

NEW BRUNSWICK,

Arseneau, James	Dalhousie Harbour	Jan. 18, 1894..	100 00
Allain, Joseph	Hay Island Beacon Light	May 21, 1895..	150 00
Balmer, Matthew	Oak Point, St. John River	April 27, 1900..	80 00
Barbour, Jas. G.	Cape Enrage Light and Fog Alarm	May 11, 1888..	800 00
Bent, A. J. Percy	Jourimain	Jan. 25, 1901..	300 00
Blacklock, Fred. G.	Cape Spencer	Mar. 5, 1888..	400 00
Brown, Charles	Quaco West Head Light	Nov. 25, 1884..	400 00
Bradshaw, L. B.	Quaco West Head Fog Alarm	Aug. 2, 1887..	400 00
Brune, John David	Goose Lake	May 11, 1888..	‡250 00
Boudreau, Jos. B.	Petit Rocher	Feb. 26, 1896..	150 00
Blakley, Lawrence	Harper Point	Sept. 9, 1887..	75 00
Bellemore, Fredk.	Dipper Harbour	Mar. 12, 1895..	100 00
Belliveau, Samuel Philip	Fort Folly Point	April 8, 1903..	175 00
Brennan, Robert	Oromocto	Mar. 18, 1903..	80 00
Belding, R. L.	Lepreau Fog alarm	April 11, 1904..	450 00
Basque, F. D.	North Tracadie Range	1904..	275 00
Cochran, Fredk. M.	Qnaco Pier Light	Mar. 25, 1892..	100 00
Cummings, Geo	Campbellton Range Light	Jan. 1, 1880..	100 00
Chapman, James	Baie du Vin Island Range Light	July 24, 1882..	200 00
Crandall, D. H.	Greys Point Pole Light	April 13, 1900..	70 00
Carney, John W.	Perry Point	Sept. 25, 1900..	80 00
Copp, A. B.	Anderson Hollow	Mar. 30, 1903..	100 00
Cormier, Jadus P.	Buctouche Bar	July 26, 1902..	200 00
Corey, Chas. A.	Head Harbour Fog alarm	June 15, 1903..	500 00
Chaffey, Harry V.	Cherry Island Fog Bell	Aug. 7, 1903..	150 00
Dickson, Elias C.	Pea Point	Nov. 16, 1898..	250 00
Delaney, John	Grant Beach Lights	Oct. 7, 1880..	125 00
Drake, Jeremiah	St. John Signal Station	Mar. 24, 1881..	750 00
Dalzell, Geo. Y.	Swallow Tail	" 18, 1893..	400 00
Dinsmore, Samuel G.	Big Duck Island Fog Alarm	July 5, 1886..	550 00
DeGrace, John.	Indian Point	June 4, 1889..	150 00
Day, W. A.	Belyea Point	Sept. 20, 1899..	90 00
Daigle, U. D.	Black Lands Gully	July 13, 1903..	100 00
Daigle, Victor	Sapin Point	May 28, 1903..	25 00
Doucett, Fred F.	Caraquet Front Range Light	Oct. 14, 1903..	50 00
Dalzell, Coleman	Gannet Rock and Explosive Signal Station	July 4, 1904..	700 00
Dakin, Lloyd Chas.	Grand Harbour	May 2, 1904..	400 00
Egan, Edward	Belloni Point	May 17, 1892..	100 00
Eldridge, John M.	Drews Head, Beaver Harbour	" 2, 1904..	250 00
Frankland, Louis	Gull Cove	Nov. 14, 1902..	80 00
Frawley, Frank	Tiner Point Fog Alarm	1904..	550 00
Flewelling, M.	Flewelling Landing	April 12, 1890..	80 00
Fanjoy, William	Fanjoy Point	Dec. 15, 1897..	80 00
Ferguson, W. G.	South Tracadie	Mar. 23, 1898..	150 00
Fox, Fraser	Gagetown	April 22, 1904..	80 00
Fitzgerald, Warren	Head Harbour Light	June 29, 1904..	300 00
Gillard, John	Shediac Harbour	June 13, 1888..	40 00
Gould, Francis T.	Shediac North Channel Range	Jan. 13, 1889..	70 00

* Per week during season of navigation. † Allowance of \$75 per annum for horse keep. ‡ Allow-
ance of \$12 per annum for supplying water.

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Light-keepers, &c.—*Continued.*

NEW BRUNSWICK—*Continued.*

Name.	Station.	Appointed.	Salary.
			\$ cts.
Gregg, Wilson....	St. John Harbour Beacon.....	1901..	350 00
Henry, Mrs. A. M.....	Hendry Farm.....	April 28, 1899..	80 00
Hayden, Michael.....	Pokemouche.....	Oct. 17, 1888..	200 00
Henderson, Arthur.....	Midjic Bluff.....	" 4, 1894..	200 00
Hamm, Chas. P.....	Musquash.....	Jan. 14, 1879..	300 00
Helms, Geo.....	Letite Passage Light and Fog Whistle.....	May 3, 1882..	*580 00
Hachey, Octave.....	Pokesudie Island.....	July 12, 1881..	180 00
Harvey, W. L.....	Machias Seal Island Light and Fog Alarm.....	.....1904..	1,000 00
Hannah, Mrs. B. G.....	Spruce Point.....	Sept. 15, 1892..	120 00
Ingalls Turner.....	Southwest Head, Grand Manan.....	Dec. 4, 1900..	500 00
Kilpatrick, Joseph.....	Passamaquoddy Bay.....	Feb. 3, 1898..	350 00
Lantaigne, Gervais.....	Caraquet Island.....	June 16, 1888..	200 00
Leblanc, Charles P.....	Cassie Point.....	May 4, 1872..	250 00
Looney, Thos. E.....	Greenhead, St. John River.....	July 14, 1886..	200 00
Lord, Lindwood.....	Southwest Wolf Island.....	April 22, 1903..	500 00
Lockhart, Edwin.....	Ward Point.....	Oct. 20, 1903..	80 00
Legère, P. L.....	Caraquet Back Range Light.....	" 14, 1903..	50 00
Mills, George.....	Fox Island, N. W. Point.....	June 23, 1897..	200 00
Morrison, Peter.....	Oak Point Lights, Miramichi River.....	July 24, 1882..	100 00
Morrison, Peter, jr.....	Portage Island.....	May 17, 1892..	300 00
Morrison, Duncan.....	Sheldrake Island Lights.....	Feb. 25, 1880..	300 00
Maillet, D. O.....	Buctouche Inner Range.....	July 7, 1883..	150 00
Matheson, R. B.....	Newcastle.....	April 18, 1898..	100 00
Murray, Michael.....	Middle Island.....	" 10, 1902..	200 00
Maloney, Wm.....	Marks Point.....	Nov. 7, 1903..	120 00
McLeod, J. H.....	Bliss Island.....	Oct. 17, 1900..	350 00
McLennan, Kenneth.....	Escuminac Light and Fog Alarm.....	Mar. 7, 1892..	750 00
McIntosh, Chas.....	Lower Neguac Wharf Lights.....	Dec. 19, 1892..	100 00
McBaine, Alex.....	Cox Point, Grand Lake.....	May 6, 1898..	80 00
MacDonald, R. P.....	Musquash Island.....	Jan. 28, 1901..	80 00
McMann, Robert Harvey.....	McMann Point.....	Nov. 2, 1901..	80 00
McNeil, Henry H.....	Dalhousie Beacon Lights and Douglas Island Lt.....	Jan. 1, 1880..	250 00
McConnell, Robert.....	Miscou Gully.....	Sept. 9, 1887..	100 00
McLean, R.....	Miramichi Bay Lt. Ship.....	April 12, 1902..	†100 00
Nevers, George F.....	Jemseg.....	Nov. 24, 1884..	80 00
Preston, S.....	Preston Beach Lights.....	July 11, 1889..	125 00
Pendlebury, Wm. J.....	St. Andrews.....	April 10, 1889..	250 00
Pickett, Robert E.....	Palmer's Landing Wharf Light.....	May 11, 1897..	80 00
Parker, Alvin.....	Mulholland Point.....	June 13, 1901..	200 00
Palmer, E. B.....	Hampstead Wharf.....	Nov. 6, 1900..	80 00
Russell, James R.....	Grindstone Island Light and Fog Alarm.....	Jan. 13, 1899..	700 00
Robichaud, Joseph L.....	Miscou Light and Fog Whistle.....	Nov. 11, 1902..	800 00
Robinson, John.....	Neguac Main Light.....	June 30, 1896..	150 00
Richard, Peter F.....	Richibuctou Head.....	May 30, 1895..	185 00
Robertson, Charles M.....	Robertson Point, Grand Lake.....	June 30, 1897..	80 00
Robertson, Meier.....	Shediac Island Range.....	Dec. 29, 1873..	250 00
Ross, Elijah.....	Negro Point.....	Mar. 5, 1878..	400 00
Robichaud, Jude.....	Richibuctou Channel Range.....	June 16, 1902..	200 00
Robichaud, Henri B.....	Buctouche Range.....	June 21, 1884..	150 00
Roherty, A.....	Little Belledune.....	Feb. 5, 1895..	100 00
Richards, D. L.....	Partridge Isd. Light and Fog Alarm.....	July 19, 1900..	800 00
Robertson, J. A. D.....	Heron Island.....	April 1, 1902..	200 00
Robichaud, Mrs. A.....	Big Shippegan.....	July 8, 1904..	280 00
Richard, Jos. F.....	Richibuctou Bar Outer Range.....	June 16, 1902..	150 00
Sutherland, Geo. C.....	Bathurst Harbour Range.....	Mar. 20, 1882..	200 00
Scott, Mrs. Ed.....	Stonehaven.....	.....1904..	100 00
Spragg, T. W.....	Hatfield Point.....	June 27, 1903..	80 00

* Allowance \$50 for keeping another light. † Allowance, \$300 for assistance.

STATEMENT giving Names and Stations of Light-keepers, &c.—Continued.
NEW BRUNSWICK—Concluded.

Name.	Station.	Appointed.	Salary.	
			\$	cts.
Thomas, Geo. H.	Lepreau Light	Aug. 29, 1884	400	00
Tatton, Geo. T.	Long Eddy Point Fog Whistle, Grand Manan.	Oct. 16, 1886	750	00
True, John Howard.	Wilnot Bluff	Sept. 12, 1899	80	00
Upton, Robert.	Bridge Point	" 11, 1899	80	00
Williston, Seymour.	Swashway Range	June 4, 1902	300	00
Wagner, Richard	Sand Point	June 7, 1883	80	00
Williams, Forrest W.	Williams Landing	May 11, 1897	80	00

NOVA SCOTIA.

Amero, Chas. A.	Argyle	Nov. 9, 1897	400	00
Amero, Geo. D.	Pubnico	Feb. 6, 1893	240	00
Amirault, James.	Sissiboo	July 11, 1899	200	00
Brown, T. J.	Little Dyke	1882	25	00
Beaman, Edwin	Digby Pier	May 29, 1897	100	00
Bonner, John Charles.	Point Aconi	Nov. 6, 1903	200	00
Burgess, Watson.	Port l'Hébert	July 26, 1892	150	00
Boutillier, R. J., supt.	Sable Island Humane Est.	Nov. 13, 1884	*700	00
Boutillier, Henry	Indian Harbour, Paddy's Head	June 6, 1901	100	00
Bollong, James	Port Harbour	Aug. 6, 1877	300	00
Bourgeois, Philip.	Cheticamp Range Lights.	May 23, 1898	150	00
Boudrot, B	Poulamon, Hawk Islet	1904	250	00
Baker, Thomas	Peases Island	May 19, 1879	350	00
Brackett, Wm.	Herring Cove	Aug. 28, 1897	100	00
Belliveau, John H.	Belliveau Cove	Feb. 16, 1889	80	00
Brownell, Luther	Cold Spring Head	Mar. 27, 1901	120	00
Buchanan, Angus A.	Neil Harbour	Aug. 14, 1899	150	00
Buckman, Chas.	Grand Passage	Jan. 7, 1901	250	00
Boudreau, W. C.	Port Felix	July 16, 1902	250	00
Burke, Henry.	Country Harbour, Green Island.	June 11, 1902	400	00
Burke, Martin.	Bourgeois Inlet.	Dec. 1, 1902	60	00
Burns, E. M.	Wedge Island	1904	400	00
Burgess, Lewis H.	Walton Harbour	July, 13, 1903	150	00
Breen, Michael.	Flint Head	1904	450	00
Bishop, F. W.	Porters Point	April 29, 1904	100	00
Chiasson, Germain.	Caveau Point Range Lights	Aug. 20, 1897	120	00
Chiasson, Joseph P.	Grand Etang, Inverness	May 21, 1901	60	00
Creighton, H. H.	Creighton Head	" 6, 1874	200	00
Connington, Thomas	Louisburg Range Lights	Oct. 26, 1897	200	00
Crowell, John.	Seal Island Light and Fog alarm	" 14, 1899	800	00
Campbell, John.	St. Paul Island Humane Establishment.	1904	700	00
Campbell, J. O.	Port Mouton	April 29, 1898	300	00
Comeau, Louis C.	Metegham River Wharf	Oct. 12, 1875	100	00
Campbell, John P.	Red Islands C. B.	Nov. 30, 1901	120	00
Croucher, George A.	Croucher Island	Jan. 31, 1883	300	00
Clough, Daniel.	Grande Dique Pole Light	July 4, 1884	60	00
Clory, Abraham.	Glasgow Point	" 25, 1894	150	00
Coolen, Albert S.	Hubbard Cove	Oct. 31, 1903	250	00
Cameron, L. G.	Beaver Harbour	Feb. 15, 1902	150	00
Christian, P. S.	Betty Island	June 29, 1904	500	00
Creelman, Samuel.	Port au Pique	May 2, 1901	25	00
Campbell, D. A.	Louisburg Fog Alarm	Mar. 20, 1902	†500	00
Cunningham, A. H.	Cape Sable Light and Fog Alarm	July 16, 1902	800	00
Cphoon, Havelock	Cranberry Island Light and Fog Alarm	Sept. 7, 1903	800	00
Corbett, George.	Port Williams	May 31, 1904	260	00
Clark, F. R.	Borden Wharf Light	April 29, 1904	100	00
Doody, James	McNab Island	July 8, 1903	360	00

* With board for self and family and assistants and allowance for salaries of staff.
† Allowance \$35 per month for assistance.

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Light-keepers, &c.—Continued.

NOVA SCOTIA—Continued.

Name.	Station.	Appointed.	Salary.	
			\$	cts.
Doane, John H.	Yarmouth or Cape Fourchu Light & Fog Alarm	July 1, 1874..	800	00
Doyle, Edward.....	Mabou Front Range Light.....	June 14, 1897..	70	00
D'Entremont, W. H.....	Abbot Harbour.....	May 22, 1888..	90	00
Dewis, F. H. P.....	Cap d'Or Fog Alarm.....	April 13, 1898..	800	00
Duann, Wm. A.....	Green Island, Richmond.....	May 20, 1902..	500	00
Dunn, Miles A.....	Margaree Harbour, Outer Range Light.....	" 12, 1903..	50	00
Doane, F. H.....	Bunker Island.....	1904..	350	00
Ellis, Wm. E.....	Point Prim or Digby Gut L. H. & F. W	Mar. 8, 1875..	800	00
Early, John.....	Margaretsville.....	Feb. 19, 1887..	230	00
Fraser, Alexr.....	Great Bras d'Or Range, Back Light.....	Jan. 13, 1903..	100	00
Fowler, Ernest E.....	Apple River Light and Fog Whistle.....	Dec. 9, 1902..	700	00
Fisher, Joel W.....	Baccaro or Barrington.....	Aug. 8, 1893..	400	00
Fulker, Wm. G.....	Devil Island.....	May 3, 1886..	420	00
Firth, Charles M.....	Coffin Island, Liverpool.....	June 30, 1880..	400	00
Foster, Israel C.....	Port Medway.....	Oct. 13, 1892..	260	00
Foster, Samuel T.....	Port Medway Breakwater.....	Feb. 17, 1899..	100	00
Foster, Geo. M.....	Port George.....	Nov. 5, 1897..	100	00
Fraser, John A.....	Dover.....	Dec. 31, 1892..	200	00
Faulkner, W. Y.....	Burnt Coat.....	June 22, 1898..	250	00
Findlay, John H.....	Bull Point, Sambro Harbour.....	Dec 7, 1899..	100	00
Franklin, J. L.....	Wolfville, N.S	April 4, 1902..	100	00
Falconer, David.....	Caribou Island.....	Dec. 20, 1902..	300	00
Gilkie, Henry A.....	Sambro Light & Explosive Light Signd Station	Jan. 8, 1867..	800	00
Giffin, Ira L.....	Isaac Harbour.....	April 28, 1894..	200	00
Gardner, Frederic T.....	Brooklyn Pier	Feb. 6, 1885..	100	00
Gallant, Patrick.....	Little Loraine.....	Jan. 16, 1900..	80	00
Goodwin, Jas. E.....	Wood Harbour.. ..	Aug. 27, 1900..	200	00
Garrison, S. H.....	Peggy Point.....	Dec. 22, 1902..	350	00
Gray, Peter Angus.....	Pennant Harbour	June 30, 1903..	100	00
Harpell, Jeremiah.....	Jeddore Harbour Range.....	Jan. 21, 1901..	200	00
Hopkins, Leslie.....	Bon Portage Island.....	Oct. 20, 1897..	350	00
Huutley, Charles H.....	Kingsport.....	June 30, 1890..	100	00
Hawley, Mathew.....	South Bay, Ingonish.....	May 13, 1897..	140	00
Hardy, John.....	Gabarus.....	Nov. 22, 1890..	200	00
Hardy, Joseph.....	Guion Island	Jan. 30, 1903..	400	00
Hinds, James.....	Victoria Beach	Mar. 7, 1901..	100	00
Hemlow, James S.....	Liscomb.....	Jan. 2, 1903..	300	00
Iceton, Wm.....	Mauger Beach Light and Fog Alarm.....	July 8, 1903..	800	00
Johnson, Edward.....	Chebucto Head Light and Fog Whistle	May 14, 1872..	800	00
Joyce, Simon.....	Seal Island, Lennox Passage.....	July 4, 1884..	100	00
Jamieson, Chas.....	Cape St. Lawrence.....	Sept. 21, 1893..	400	00
Jameson, Geo. C.....	Cole Harbour Range.....	Oct. 21, 1898..	150	00
Knowlan, Alfred.....	Queensport.....	Nov. 13, 1902..	300	00
Kent, J. H.....	Musquodoboit Harbour Range Front Light. .	April 29, 1904 ..	125	00
Kent, John.....	Musquodoboit Harbour, Back Light.....	April 29, 1904..	100	00
Long, Joseph.....	Canso Harbour.....	Dec. 31, 1896..	250	00
Long, Joseph.....	False Passage Ledge.....	Aug. 4, 1903..	*10	00
Leblanc, Severin.....	Tusket River	July 1, 1888 ..	250	00
Lowden, David.....	Pictou Harbour Range Lights	" 12, 1897..	150	00
LeVashe, Wm.....	Arichat.....	Oct. 17, 1898..	250	00
Lyons, John H.....	Barrington East Bay Light-ship.....	June 18, 1897..	600	00
Landry, Edward.....	Petit de Grat	Feb. 23, 1897..	200	00
Larkin, Ephraim.....	Stoddart Island.....	Mar 18, 1896..	200	00
Leblanc, Benjamin.....	Candle Box Island.....	Nov. 1, 1892..	300	00
Larkin, N. C.. ..	Lurcher Shoal Light-ship. . .	" 1904..	†1,200	00
Morrell, B. H.....	Brier Island, Fog Whistle.....	June 6, 1901..	400	00

* For three of the winter months.

† Crew paid by Department.

STATEMENT giving Names and Stations of Light-keepers, &c.—Continued.
NOVA SCOTIA—Continued.

Name.	Station.	Appointed.	Salary.
			\$ cts.
Morrison, M. D.	Black Rock Point	June 8, 1892	250 00
Muise, Marcellin	Cheticamp	Nov 27, 1896	300 00
Misner, John E.	Fort Point	May 16, 1896	150 00
Moser, Samuel	Moser Island	Nov. 6, 1885	350 00
Mullins, James	Mullins Point	June 8, 1892	250 00
Munro, William	Pictou Bar	Nov. 22, 1890	460 00
Murphy, Michael	Pomquet Island	Dec. 18, 1890	350 00
Mundell, Edward	Eddy Point	July 28, 1903	400 00
Martell, John T	Scatterie Light and Fog Whistle	July 30, 1897	800 00
Murray, John	Cape George, Great Bras d'Or Lake	Nov. 3, 1882	200 00
Munroe, William L	Three Top Island	Oct. 28, 1879	300 00
Mitchell, John W.	Jeddore Rock	Sept. 29, 1882	400 00
Mitchell, Wm. A	Quaker Island	Feb. 17, 1896	300 00
Matheson, Murdoch	Whycocomah Pole Light	Sept. 11, 1884	60 00
Morrison, Widow	Freestone Islet Pole Light	June 5, 1897	150 00
Mauger, John J	Cape LaRonde	Nov. 16, 1898	300 00
Melanson, J. W.	Gilbert Point	1904	200 00
Morris, P. E	Isle Haute	1904	500 00
Morris, John H.	Advocate Harbour	1904	250 00
Myrick, John	Cape Race, Newfoundland, L. H. & F. W.	Nov. 1, 1897	1,000 00
Mathews, Wm.	Canso Lights	1904	200 00
McDonald, Robert	Carter Island	Jan. — 1885	275 00
McRae, Roderick	Margaree or Sea Wolf Island	Feb. 3, 1898	400 00
McLellan, Rod'k	Margaree Harbour, Inner Range	June 8, 1901	50 00
McKay, R.	North Canso	Feb. 4, 1882	350 00
McFarlane, Andrew	Pictou Island	June 8, 1892	400 00
McDonald, John A.	Port Hood	May 10, 1880	280 00
McDonald, James	Point Tupper	Mar. 15, 1870	300 00
McAskell, Donald	St. Ann Harbour	June 26, 1889	140 00
McLean, H.	Gillis Point	Dec. 18, 1897	150 00
McRae, Hector	McKenzie Point, Great Bras d'Or	Aug. 20, 1890	160 00
McLeod, Norman	Cape North, Money Point	Oct. 14, 1899	400 00
McNeil, F. X. S.	Iona	Nov. 16, 1901	120 00
McRae, Donald	Kidston Island	May 17, 1892	200 00
McLeod, Angus	St. Esprit Island	Oct. 27, 1880	400 00
McDonald, Norman	Gooseberry Island or Marjorie Isle	July 4, 1884	100 00
McAskill, Kenneth	Jerome Point	" 30, 1901	250 00
McNeil, John C.	Piper Cove	Dec. 18, 1897	120 00
McNeil, Laughlin	McNeil Beach, Great Bras d'Or	Aug. 6, 1884	60 00
McFadyen, Malcolm	Mabou Back Range Light	April 17, 1891	50 00
McNeil, Daniel Y.	Campbell Island, Victoria Co.	July 30, 1903	100 00
McEachern, A. L.	Cape George	Sept. 8, 1898	450 00
McLeod, Murdoch	Pugwash	Dec. 10, 1897	300 00
McKenna, John L.	Cape Roseway, Light and Fog Alarm	Mar. 31, 1899	800 00
MacIntosh, James	Egg Island	July 28, 1899	500 00
McDonald, Rod.	Clarke Cove	April 22, 1904	100 00
McLellan, Baxter	Spencer Island	1904	100 00
McLellan, Ingersoll L.	Economy Pole Light	May 16, 1899	*6 00
McAdam, Hugh R.	Arisaig	Nov. 14, 1898	100 00
McKay, Hector G.	Bird Island	May 21, 1901	450 00
McLean, Malcolm	Great Bras d'Or Range, Front Light	Jan. 13, 1903	100 00
McLennan, John Angus	Henry Island	July 21, 1903	400 00
McKenzie, John	South-west Point, St. Paul Island	1904	400 00
Nass, Henry	Battery Point	Mar. 12, 1897	300 00
Nickerson, Byron	Negro Island	July 26, 1897	300 00
Nunn, George	Sydney South Bar	June 20, 1872	300 00
O'Leary, Wm. E.	Beaver Island	Feb. 22, 1900	350 00
J'Hara, Theodore	Port Bickerton	Jan. 26, 1901	150 00
Orchard, L. D.	Ragged Island Harbour, Gull Rock	" 1, 1877	400 00
O'Neill, Thos.	Low Point Fog Alarm	May 2, 1904	500 00
Payzant, Jason	Little Hope Island	Oct. 22, 1901	500 00
Pearl, Albert	Green Island off Margaret's Bay	Dec. 29, 1873	500 00

* Per month during season of navigation.

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Light-keepers, &c.—*Continued.*

NOVA SCOTIA—*Concluded.*

Name.	Station.	Appointed.	Salary.	
			\$	cts.
Price, Philip.	Louisburg Light.	Nov. 8, 1897.	350	00
Peters, John G.	Low Point Light.	Oct. 1, 1865.	460	00
Pettis, William.	Parrsboro'.	Dec. 6, 1888.	340	00
Palmer, Howard W.	Wolf Point.	Oct. 14, 1899.	250	00
Palmer, H. W.	Lahave, Fort Point.	May 22, 1878.	200	00
Perry, John.	Sheet Rock.	Dec. 17, 1878.	500	00
Perry, Levi.	North East Harbour Range.	June 17, 1899.	200	00
Peters, John N.	Brier Island Light.	" 6, 1901.	400	00
Pope, John.	Main-à-Dieu.	Sept. 11, 1902.	300	00
Patterson, Wm.	Dartmouth.	June 3, 1903.	100	00
Robinson, Charles.	Black Rock.	Mar. 16, 1885.	330	00
Ruggles, Frank.	Boars Head.	May 24, 1901.	350	00
Robicheau, B. H.	Cape St. Mary.	July 5, 1886.	350	00
Rathburn, S. M.	Horton Bluff.	Sept. 3, 1879.	250	00
Ross, Robert.	George Island.	Jan. 18, 1876.	250	00
Roblee, Jacob V.	Shafner Point.	May 29, 1897.	150	00
Riley, Simon W.	Annapolis Royal.	Mar. 7, 1892.	100	00
Richards, Stephen C.	Charlo Harbour Range.	Nov. 4, 1901.	120	00
Ross, Alex. W.	Little Narrows.	May 23, 1902.	120	00
Rogers, Lloyd.	Amet Island.	Nov. 11, 1902.	450	00
Rose, John.	N. E. Point St. Paul Island.	July 17, 1897.	400	00
Roney, Henry.	Granville Centre.	Feb. 24, 1904.	75	00
Smith, Eph.	Sambro Inner Island Pole Light.	Jan. 3, 1900.	100	00
Scott, M. C.	Guysborough Harbour.	April 19, 1884.	220	00
Spencer, Robert A.	Spencer Point.	" 1, 1870.	125	00
Suthern, Edward W.	Westport.	" 12, 1890.	300	00
Saulnier, John H.	Church Point, St. Mary Bay.	Aug. 8, 1878.	200	00
Sampson, C.	Ouetique Island.	Dec. 1, 1874.	350	00
Strum, James A.	Westhaver Island.	Sept. 25, 1888.	200	00
Sollows, A. J.	Port Maitland or Green Cove Pole Light.	Dec. 28, 1900.	75	00
Sampson, Theodore.	Beaver Island.	Oct. 15, 1892.	80	00
Smith, Caleb.	Salter Head Beacon Light.	June 21, 1888.	60	00
Smith, William B.	Westhead, Cape Sable Island.	April 12, 1890.	200	00
Simpson, John.	Pictou Custom House Light.	Dec. 10, 1901.	100	00
Smeltzer, John D.	Hobson Island.	April 10, 1900.	300	00
Smith, John Young.	Page Island.	Jan. 17, 1901.	150	00
Stevens, James Gordon.	Sand Spit, Shelburne Harbour.	Mar. 11, 1903.	280	00
Slaunwhite, S. P.	Terence Bay.	Oct. 13, 1903.	100	00
Vigneau, George.	Jerseyman Island.	Mar. 23, 1883.	300	00
Vance, Geo. W.	Masstown or Debert.	June 29, 1898.	25	00
Wolfe, Howard M.	West Ironbound Island.	June 22, 1895.	250	00
Wells, James.	Whitehead Island.	Oct. 20, 1897.	510	00
Wambold, James.	Sheet Harbour Passage.	May 11, 1887.	50	00
Webb, Patrick.	Harbour au Bouche.	Feb. 19, 1896.	250	00
Webber, James M.	Torbay.	May 10, 1898.	300	00
Wynacht, W. H.	Cross Island Light and Fog Whistle.	April 13, 1898.	800	00
Warren, R. V.	Ingonish Island.	Sept. 17, 1903.	360	00
Walsh, John.	Lingan Head.	— 1904.	200	00
Young, Uriah.	Chester, or East Ironbound Island.	Feb. 15, 1884.	400	00
Yorke, Freeman.	Cape Sharpe.	June 30, 1902.	750	00

PRINCE EDWARD ISLAND.

Anderson, Albert.	St. Peters Range.	July 25, 1900.	130	00
Allen, Joel S.	Indian Point Pier.	May 18, 1898.	375	00
Beaton, Angus F.	Hazard Point Range, Back Light.	Nov. 21, 1902.	60	00
Clark, Jesse George.	Georgetown Range, Back Light.	Aug. 14, 1901.	125	00
Champion, Wm.	Northport Range.	Oct. 25, 1897.	100	00

STATEMENT giving Names and Stations of Light-keepers, &c.—Continued.

PRINCE EDWARD ISLAND—Concluded.

Name.	Station.	Appointed.	Salary.
			\$ cts.
Costain, Frederick.....	Miminegash Range, Back Light.	May 19, 1897..	40 00
Connors, George.....	Georgetown, St. Andrew's Point	June 3, 1901..	150 00
Fraser, John.....	Summerside Range Front Light	April 12, 1897..	100 00
Gaudet, Agape	Big Tignish Range.....	Aug. 30, 1897..	130 00
Gillis, Donald.	Point Prim	Dec. 10, 1897..	300 00
Gallant, Jos. J. D	Cape Egmont.....	Oct. 21, 1902..	200 00
Hardy, Wm.....	Little Channel Range.....	July 26, 1875..	100 00
Howatt, Abner J.	Leards Range, Outer Light, Crapaud.....	" 22, 1893..	100 00
Harris, Wm	Cape Bear	Nov. 11, 1896..	375 00
Inman, James	Leards Range, Inner Light, Crapaud.....	— — 1901..	100 00
Kielly, John Andrew	Cove Head Lights	Nov. 27, 1890..	90 00
Lewis, James.....	Brighton Beech Range.....	March 1, 1899..	100 00
Munn, Duncan	Little Sands.. ..	May 1, 1877..	30 00
Morrison, John D.....	Cardigan River... ..	Aug. 15, 1901..	100 00
McDonald, John	Tracadie	May 24, 1901..	100 00
McRae, Daniel	Hazard Point Range, Front Light.....	April 6, 1900 ..	70 00
McDonald, Lauchlin.....	East Point Light and Fog Whistle.....	Jan. 18, 1901..	600 00
McDonald, John.....	Douse Point Range, Orwell... ..	June 25, 1879..	70 00
McLeod, Jas. H	New London.....	Jan. 29, 1896..	125 00
McDonald, Wm	West Point.....	Aug. 22, 1876..	300 00
McKay, Rodk. W.....	Wood Island	April —, 1899..	250 00
McDonald, Angus	Souris East Lights.....	Nov. 13, 1880..	300 00
McDonald, Jas. A.....	Savage Harbour Range.....	July 11, 1889..	100 00
McLeod, Lemuel.....	Murray Harbour Front Light.....	Dec. 21, 1897..	50 00
McPherson, Daniel W.....	Brush Wharf Range, Orwell.....	Jan. 13, 1899..	60 00
McNeil, Alex. S	Block House Point, Charlottetown.....	March 25, 1901..	340 00
O'Brien, Patrick.... .	Miminegash Range Front Light.....	May 14, 1897..	70 00
Phee, James	North Point.. ..	Sept. 4, 1897..	300 00
Penny, Robert.....	Murray Harbour, Back Light.....	Nov. 11, 1897..	50 00
Pino, Joseph N.....	North or Grand Range Rustico	Feb. 6, 1897..	125 00
Ranaghan, Peter.....	Sea Cow Head.....	April 21, 1873 ..	250 00
Robertson, Alfred.....	Annandale Range.....	Oct. 5, 1898..	100 00
Sinclair, Wm.....	Fish Island.....	March 8, 1897..	250 00
Stavart, Geo.....	Summerside Range, Back Light	Sept. 8, 1895..	80 00
Steele, Colin.....	Panmure Head	June 3, 1901..	250 00
Tuplin, Jas. C.... .	Sandy Island, Cascumpec.....	May 5, 1897..	300 00
Taylor, Chas.	Darnley Point Range Lights.....	June 14, 1897..	60 00
Taylor, James W.....	St. Peters Island.....	May 1, 1897..	200 00
Wiggins, G. W. J.....	Darnley Point Range.....	Oct. 16, 1896..	100 00
Wright, Chas. L.....	Wright Range, Crapaud Harbour.	June 14, 1894..	100 00
Young, James.....	Wood Island Harbour.....	Nov. 14, 1902..	80 00

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Light-keepers, &c.—*Concluded.*

BRITISH COLUMBIA.

Name.	Station.	Appointed.	Salary.
			\$ cts.
Allison, Frank Fagan....	Portier Pass.	Nov. 12, 1902..	*30 00
Brown, Wm. Henry ..	Ballinac Islands	Oct. 3, 1901..	200 00
Black, George M.....	Fiddle Reef.....	May 21, 1903..	400 00
B.C. Electric R.R.Co....	Brotchy Ledge.....	.... .. 1903..	200 00
Carpenter, C.....	Dryad Point.....	Nov. 7, 1899..	†240 00
Crozier, James.....	Bare Point, Chemainus.....	June 12, 1897 ..	168 00
Clarke, M. G.....	Entrance Island Light and Fog Whistle....	Nov. 26, 1897..	900 00
Codville, James.....	Pointer Island.....	Dec. 26, 1899..	360 00
Croft, M. A.....	Discovery Island Light and Fog Whistle.....	April 1, 1902..	900 00
Campbell, W.....	Gallows Point and Middle Ground Beacons.....	.... ..	180 00
Daykin, William P.....	Carmanah Point Light and Fog Whistle.	Nov. 4, 1890..	1,200 00
Davidson, John.....	Cape Mudge.....	June 27, 1898..	360 00
Eastwood, F. M.....	Race Rocks Light and Fog Whistle.	Jan. 31, 1891..	1,200 00
Erwin, Walter.....	Point Atkinson Light and Fog Whistle....	Oct. 5, 1880..	1,000 00
Forsythe, James.....	Ivory Island.....	Sept. 5, 1900..	500 00
Franklin, Wm. Thos.....	Merry Island	Jan. 8, 1904..	360 00
Farnehough, W. C . . .	The Sisters.....	May 31, 1904..	500 00
Georgeson, Henry.....	Active Pass Light and Fog Whistle.....	July 21, 1884..	900 00
Georgeson, James.....	Saturna Island, East Point.....	Oct. 26, 1889..	550 00
Grove, John.....	Prospect Point.....	June 27, 1898..	300 00
Gallup, J. W.....	Proctor.....	Jan. —, 1900..	240 00
Gordon, Walter.....	Yellow Island.....	Sept. 27, 1901..	500 00
Georgeson, John.....	Walker Rock .....	.... ..	240 00
Garrard, F. C.....	Lennard Island.....	.... .., 1904..	600 00
Harrap, R.. ..	Coffin Islet and Miami Reef	Apr. 15, 1903..	300 00
Harrison, S. G.....	Berens Island.....	Nov. 4, 1897..	†300 00
Harvey, Thos. W.....	Lawyer Islands	Oct. 22, 1901..	600 00
Jeffries, Alfred.	Sister's Rock, Vancouver.....	April 30, 1901..	500 00
Jones, William D.....	Brocton Point, Burrard Inlet.....	Aug. 20, 1890..	300 00
Johnson, Capt. George....	Fisgard.....	July 30, 1901..	500 00
Kootenay Electric Light Co.	Kaslo	Dec. 1, 1897..	240 00
Moore, Hugh.	Dock Island.....	May 15, 1903..	*20 00
McColl, S. W.....	Garry Point.....	July 24, 1898..	*10 00
McColl, S. W.....	Mouth Fraser River Lights.....	March 1, 1903..	*25 00
O'Brien, Michael.....	Fraser River.....	.... .. 1904..	900 00
Patterson, Thomas.....	Cape Beale... ..	March 2, 1895..	1,200 00
Richardson, John	Portlock Point Light and Bell	Dec. 2, 1895..	460 00
Scarlet, Robert.	Egg Island.....	Aug. 22, 1900..	600 00
Sparks, T....	Shoal Point and Middle Rock.	Jan. 29, 1903..	180 00

* Per month. † Allowance, \$60 per annum for mail service.

DEPARTMENT OF MARINE AND FISHERIES,
OTTAWA.

APPENDIX No. 20.

STATEMENT relating to the Wharfs under the control of the Department, on
June 30, 1904.

Locality.	Wharfinger.	Date of Appointment of Wharfinger.	Remuneration allowed.	Amount deposited to credit of Receiver General.
Ontario.				\$ cts.
Blind River.....	James Lachore.....	Sept. 17, 1903.	25 p.c. of collections....	
Bruce Mines.....	Wm. Fleming.....	April 15, 1902.	25.....	60 15
Cockburn Island.....	G. McKenzie.....	May 19, 1903.	25 p.c. of collections....	
Goderich.....	W. Marlton.....	Feb. 14, 1894.	25.....	469 95
Hilton, St. Joseph Id., Algoma	E. Stubbs.....	June 20, 1898.	50.....	272 35
Kingsville.....	W. H. Black.....	Aug. 1, 1902.	25.....	38 42
L'Orignal.....	E. A. Hall.....	Mar. 23, 1904.	25.....	
Morpeth.....	C. Stammers.....	Aug. 1, 1892.	25.....	
North Bay.....	W. McKenzie.....	Oct. 9, 1900.	25.....	
Pelee Island.....	Wm. Rinkel.....	Sept. 1, 1903.	25.....	204 95
Fort Finley.....	M. McLennan.....	May 10, 1902.	25.....	
Port Rowan.....	John Collett.....	May 2, 1898.	25.....	
Richard's Landing, Algoma..	R. Arnistrong.....	Mar. 11, 1899.	50.....	56 30
Rondeau.....	W. R. Fellowes.....	Dec. 17, 1883.	25.....	30 42
Sault Ste. Marie.....	Geo. A. Boyd.....	April 9, 1897.	\$142 per month during season of navigation...	250 01
Sheguindah.....	John Hastie.....	June 11, 1902.	25 p.c. of collections....	54 38
Southampton.....	Geo. McVittie.....	Aug. 16, 1895.	25 p.c. ".....	150 20
Summerstown.....	Under lease.....			
Thessalon, Algoma.....	D. J. Sandie.....	April 22, 1902.	25 p.c. of collections....	94 06
Wiarton.....	Philip Gilbert.....	" 22, 1902.	25.....	81 75
			Total.....	1,762 94
Quebec.				
Agnes, Lake Megantic.....	L. A. Roy.....	Nov. 27, 1891.	25 p.c. of collections....	
Anse St. Jean.....	F. Lavoie.....	Mar. 13, 1895.	25.....	
Baie St. Paul.....	Vacant.....			
Baie St. Paul, Isolated Block.	H. Tremblay.....	Sept. 4, 1894.	25.....	
Beauport.....	D. Giroux.....	Nov. 11, 1896.	25.....	
Berthier.....	E. Gaumond.....	July 5, 1897.	50.....	111 00
Cap-à-Aigle.....	Jos. Guay.....	Oct. 7, 1896.	25.....	
Carleton.....	Chas. Bernier.....	April 15, 1902.	\$50 per annum.....	8 28
Cascades.....	Moïse Leroux.....	Oct. 20, 1897.	25 p.c. of collections....	
Cedars.....	J. Reay.....	April 29, 1898.	25.....	
Chicoutimi.....	Thomas Tremblay.....	May 23, 1901.	25.....	
Côteau du Lac.....	M. St. Amour.....	Sept. 21, 1896.	50.....	24 30
Côteau Landing.....	J. A. Prieur.....	May 25, 1897.	25.....	
Echo Vale, Lake Megantic...	D. P. Matheson.....	" 16, 1894.	25.....	
Esquimaux Point.....	Vacant.....			
Grand River.....	Geo. Beaudin.....	Nov. 16, 1896.	25.....	243 34
Greece's Point.....	T. Ranger.....	July 16, 1902.	25.....	45 71
Isle aux Grues.....	Désiré Vezina.....	June 13, 1904.	25.....	
Isle Perrot.....	Roger Leduc.....	Oct. 20, 1897.	25.....	
Knowlton's Landing.....	L. Knowlton.....	Nov. 26, 1897.	25.....	
Lacolle.....	R. J. Robinson.....	Mar. 8, 1894.	25.....	6 56
Les Eboulements.....	M. Tremblay.....	Sypt. 4, 1894.	25.....	
L'Islet.....	Octave Morin.....	Feb. 8, 1893.	25.....	
Longueuil.....	Eusèbe Denicourt.....	May 15, 1901.	25.....	53 60
Magog.....	Edward Addy.....	June 20, 1898.	25.....	
Matane.....	Louis Durette.....	Aug. 25, 1900.	25.....	216 72
Murray Bay.....	Elie Maltais.....	" 15, 1893.	25.....	
New Carlisle.....	John Chisholm.....	April 22, 1902.	50.....	123 71
Percé.....	E. Bourget.....	Mar. 11, 1903.	25.....	41 86
Port Daniel.....	Geo. McInnis.....	April 30, 1903.	\$50 per annum.....	81 34

SESSIONAL PAPER No. 21

STATEMENT relating to the Wharfs, &c.—*Continued.*

Locality.	Wharfinger.	Date of Appointment of Wharfinger.	Remuneration allowed.	Amount deposited to credit of Receiver General.
<i>Quebec—Con.</i>				\$ cts.
Port Lewis.....	Sam. Carson.....	Sept. 21, 1899.	25 p. c. of collections....	
Rimouski.....	Chas. Lepage.	July 24, 1894.	25 " ".....	
Rivière Ouelle.....	J. Hudon dit Beau- lieu	Nov. 28, 1892.	25 " ".....	
Rivière du Loup.....	F. E. Gilbert.....	Aug. 15, 1902.	\$146 per annum....	155 66
St. Anicet.....	S. Dupuis.....	Sept. 14, 1896.	25 p. c. of collections....	
St. Alphonse de Bagotville...	Abel Tremblay	July 7, 1891.	25 " ".....	65 45
St. Irénée.....	Geo. Bouchard.	Feb. 10, 1903.	25 " ".....	
St. Jean d'Orléans.....	L. Lachance.....	Sept. 26, 1896.	25 " ".....	132 44
St. Jean Port Joli.,.....	J. Pelletier.....	" 14, 1896.	25 " ".....	
Ste. Cécile du Bic.....	Olivier Ouellette ..	Aug. 24, 1900.	25 " ".....	85 46
St. Laurent d'Orléans.....	Joachim Godbout....	May 11, 1904.	25 " ".....	37 96
St. Nicholas.....	Under lease.....		25 " ".....	37 50
St. Thomas de Montmagny ..	L. L. Dionne.....	Oct. 22, 1896.	25 " ".....	1 12
St. Zotique.....	J. M. Leroux.	Sept. 14, 1896.	25 " ".....	
Tadoussac.....	A. Christiansen.....	Oct. 20, 1897.	25 " ".....	
Trois Pistoles.....	D. Damour.....	May 10, 1895.	25 " ".....	
Valois Point.....	L. Castonguay....	Oct. 20, 1897.	25 " ".....	
Ville Marie.....	Jules Maillard.....	Feb. 2, 1899.	25 " ".....	
Total.....				1,472 01
<i>Nova Scotia.</i>				
Arisaig.....	H. R. McAdam.	Dec. 30, 1898.	25 p. c. of collections....	39 34
Avonport.	L. F. Fuller.....	Aug. 15, 1902.	25 " ".....	26 08
Rabin's Cove.....	Alex. Thomas.....	Oct. 20, 1897.	25 " ".....	6 51
Barrington.....	J. H. Christie.	Aug. 31, 1896.	25 " ".....	123 70
Bass River.	Jotham Fulton.....	Jan. 6, 1898.	25 " ".....	
Bayfield.....	Roderick Grant.	April 23, 1902.	25 " ".....	36 19
Bear Point.....	E. R. Smith.....	Feb. 19, 1902.	.....	2 74
Belliveau Cove.....	St. Clair Thériau....	Nov. 24, 1892.	25 " ".....	77 02
Black Point.....	J. P. Littlewood....	Jan. 8, 1904.	25 " ".....	
Broad Cove.....	John Teal.....	June 12, 1893.	25 " ".....	
Broad Cove March.....	Hugh McDonald....	Oct. 19, 1892.	25 " ".....	
Canada Creek.....	Henry Dickey.....	Aug. 12, 1899.	25 " ".....	
Cape Cove.....	J. A. Ellis.....	May 14, 1897.	25 " ".....	
Centreville	Alfred Ward.. . . .	" 28, 1897.	25 " ".....	106 42
Chipman's Brook.....	Abner Barkhouse....	Dec. 21, 1903.	25 " ".....	2 48
Church Point.....	Chas. F. Belliveau..	Aug. 20, 1892.	25 " ".....	80 65
Cranberry Head.....	A. Shaw.....	May 26, 1903.	25 " ".....	
Cribbens Pier, Antigonish Hr.	A. R. Boyd.....	Oct. 2, 1895.	25 " ".....	
Delap's Cove.....	R. W. McCaul.....	Nov. 28, 1889.	25 " ".....	7 78
Descousse.	Thos. Boudrot	Feb. 22, 1902.	25 " ".....	40 58
Descousse (New).....	J. Gruchy.....	Jan. 27, 1904.	25 " ".....	7 55
Digby.....	W. W. Hayden.....	April 20, 1897.	25 " ".....	2,438 01
Eagle Head.....	Nathan Leslie	Jan. 9, 1889.	25 " ".....	
East Bay.....	Alex. McGillivray ..	Aug. 3, 1903.	25 " ".....	
East River, Sheet Harbour...	Malcolm McFarlane..	May 20, 1890.	25 " ".....	
Grand Narrows, Victoria Co.	F. X. McNeil.....	Nov. 11, 1896.	25 " ".....	
Grand Narrows, Cape Breton Co.....	Neil McNeil.....	Aug. 6, 1898.	25 " ".....	
Great Village.	Vacant			
Granville Centre.....	Henry Roney.....	July 6, 1903.	25 p. c. of collections....	65 67
Hall's Harbour.....	T. A. Neville	Jan. 8, 1897.	25 " ".....	28 77
Hampton.....	E. B. Foster.....	May 23, 1904.	25 " ".....	19 01
Hantsport.....	Vacant.....			
Harbourville.....	Isaac Cook.	May 28, 1897.	25 " ".....	15 61
Horton Landing.....	F. G. Curry	April 30, 1898.	25 " ".....	2 00
Iona, Grand Narrows.....	F. S. X. McNeil....	June 8, 1901.	25 " ".....	
Irish Cove....	Malcolm McNeil. l..	" 6, 1902.	25 " ".....	
Isaac's Harbour.	T. D. Cook.....	Jan. 30, 1902.	25 " ".....	28 43
Jordan Bay ..	John Fredericks	Feb. 20, 1900.	25 " ".....	89 10
Kelly Cove.....	Jos. B. Huskins.....	April 11, 1899.	25 " ".....	
Little Narrows.....	Vacant.....			
Lismore.....	D. A. McKinnon ..	July 5, 1895.	25 p. c. of collections....	
Maitland, Hants Co.....	Vacant.....			

STATEMENT relating to the Wharfs, &c.—Continued.

Locality.	Wharfinger.	Date of Appointment of Wharfinger.	Remuneration allowed.	Amount deposited to credit of Receiver General.
Nova Scotia.				\$ cts.
Margaretsville	C. S. McLean.	May 7, 1897.	25 p.c. of collections.....	111 71
Meteghan Cove	H. F. Robicheau.....	" 28, 1897.	25 "	29 00
Meteghan River	D. D'Entremont.....	" 14, 1897.	25 "	16 94
Militia Point	D. McIntosh.....	Aug. 20, 1892.	25 "	
Morden	John Redgate.....	Nov. 16, 1893.	25 "	31 28
Noel.....	Vacant			
Northside Boularderie.....	"			
Oak Point (Kings port)	Rent from Railway Company.....			200 00
Ogilvie	R. S. Armstrong.....	May 13, 1901.	25 p.c. of collections.	14 16
Parrsboro'.....	Thompson Tipping.....	Nov. 26, 1888.	25 "	
Parker's Cove.....	S. Anderson.....	July 21, 1903.	25 "	57 79
Pickett's Wharf.....	Freeman A. Eaton.....	Aug. 2, 1899.	25 "	34 02
Pictou Island	Vacant			
Plymouth	James B. Purdy	Feb. 22, 1902.	25 "	
Plympton	Wm. K. Smith	Aug. 8, 1890.	25 "	
Port Dufferin, Halifax Co.....	H. J. Balcom.....	Feb. 17, 1899.	25 "	50 37
Point Brulé	Alex. Craig	Dec. 26, 1898.	25 "	
Port George.....	Outhit Douglas	June 26, 1900.	25 "	73 83
Port Greville	Vacant			
Port Hood	Albert Macdonell.....	May 22, 1900.	25 "	
Port Joli	Jos. S. McAdams.....	Feb. 5, 1900.	25 "	
Port La Tour.....	David Sholds.....	" 1, 1900.	25 "	19 97
Port Lorne	Freeman Beardsley.....	June 22, 1897.	25 "	37 45
Port Maitland, Yarmouth Co.....	J. Ellis.....	Dec. 10, 1896.	25 "	20 05
Port Morien.....	John McAulay.....	" 10, 1896.	7½ "	458 49
Riverside.....	Geo. W. Hawes	Mar. 11, 1902.	25 "	15 76
Salmon River, Digby Co	J. M. Deveau	Nov. 29, 1890.	25 "	
Saulniersville	John T. Saulnier.....	Aug. 25, 1888.	25 "	6 54
Swims Point	John F. Duncan.....	Jan. 23, 1902.	25 "	6 25
Tancook Island	Amos H. Stevens.....	Mar. 11, 1898.	25 "	
Tidnish	R. A. Smith.....	Sept. 27, 1901.	25 "	
Tracadie.....	J. M. Hall.....	Nov. 6, 1888.	25 "	
Tusket Wedge.....	Vacant.....			
Town Point.....	J. A. Haley	Aug. 16, 1901.		
Victoria.....	Amos West	Dec. 4, 1900.	25 p.c. of collections.....	1 97
Wallace.....	Vacant			
Wallace Harbour, South side.....	"			
West Pubnico	Chas. C. D'Entremont	Mar. 28, 1898.	25 p.c. of collections.....	29 06
West River, Sheet Harbour	Malcolm McFarlane.....	Sept. 3, 1889.	25 "	
White Point.....	Elisha West.....	Jan. 9, 1889.	25 "	
White Waters.....	Jos. Irvine.....	Sept. 27, 1901.	25 "	2 51
Whycocomagh	D. S. Carmichael	Oct. 31, 1903.		52 79
Wolfville	J. L. Franklin	" 22, 1901.		
Total				4,513 48
New Brunswick.				
Anderson's Hollow	W. C. Anderson	Feb. 13, 1899.	25 p.c. of collections.	87 21
Bathurst	Thomas F. Leahy.....	Sept. 4, 1903.	25 "	15 75
Black River	J. F. McGourty.....	Oct. 31, 1902.	25 "	20 06
Buctouche.....	J. J. Leblanc.....	May 2, 1892.	25 "	65 55
Burnt Church.....	James Anderson.....	Feb. 26, 1904.	25 "	2 50
Campbellton	G. E. Asker	May 11, 1904.	25 "	525 18
Cape Tormentine	E. T. Allen	Oct. 20, 1897.	25 "	354 88
Clifton, Stonehaven.....	S. Payne	Nov. 9, 1894.	25 "	
Cocagne	H. Bourgeois	Aug. 9, 1900.	25 "	1 91
Cole's Point, Dorchester.....	Edward Cole.....	" 29, 1903.	25 "	
Dalhousie	W. J. Smith	June 27, 1891.	25 "	75 06
Egdetts Landing.....	Thos. Barnett.....	July 5, 1895.	25 "	29 53
Gardner's Creek	Robert Wallace.....	Dec. 11, 1899.	25 "	
Hopewell Cape	Geo. D. Wilson.	April 10, 1899.	25 "	107 00
Kingston	P. Thibodeau.....	Jan. 31, 1901.	25 "	
Main River, Richibucto.	A. J. Curran	Aug. 30, 1902.	26 "	
Neguac	B. Poirier	June 17, 1897.	25 "	

SESSIONAL PAPER No. 21

STATEMENT relating to the Wharfs, &c.—*Concluded.*

Locality.	Wharfinger.	Date of Appointment of Wharfinger.	Remuneration allowed.	Amount deposited to credit of Receiver General.
<i>New Brunswick—Con.</i>				\$ cts.
Quaco	Wellington Vale....	Dec. 19, 1899.	25 p.c. of collections.....	4 60
St. Louis.....	C. Frigand	Oct. 29, 1895.	25 "	
St. Mary's.	M. J. S. Leblanc....	Mar. 1, 1897.	25 "	
St. Nicholas River, S. Welford	John Grant	Sept. 27, 1901.	25 "	
Tracadie.....	Prosper Savoy	" 23, 1899.	25 "	
Two Rivers.....	Wesley Wilbur	Jan. 8, 1904.	25 "	
Total				1,289 2
<i>Prince Edward Island.</i>				
Annandale	W. C. Jenkins.....	May 4, 1897.	25 p.c. of collections.....	60 91
Bay View.....	Joseph Harrington..	Oct. 2, 1885.	25 "	13 21
Belfast.....	Jas. F. Halliday....	May 1, 1901.	25 "	94 90
Brush Wharf, Port Selkirk...	Levi R. Ings.....	Sept. 18, 1885.	25 "	102 33
Campbell's Cove.....	Angus McIntyre ...	Oct. 17, 1888.	25 "	
Chapel Point.....	Roland McCormack.	Sept. 18, 1885.	25 "	16 33
China Point.....	W. S. N. Crane. ...	" 18, 1885.	25 "	21 63
Clifton.....	John Gunn.	May 24, 1900.	25 "	
Cranberry, East River.....	James Hughes	Mar. 11, 1898.	25 "	
Crapaud, Victoria Pier.....	E. McKinnon.....	July 7, 1897.	25 "	204 88
Georgetown.....	R. R. Jenkins	Oct. 14, 1892.	25 "	25 33
Haggerty's Wharf, E. River..	M. Burnett.....	Feb. 14, 1898.	25 "	
Hickey's Wharf.....	Mark Webster.....	Oct. 22, 1896.	25 "	30 75
Higgin's Shore.....	G. G. Henry.....	Nov. 9, 1891.	25 "	
Hurd's Point.....	Thos. Montgomery..	Aug. 16, 1901.	25 "	37 38
Kier's Shore.....	W. Hodgson.....	June 10, 1895.	25 "	121 00
Lambert.....	Wellington Johnston	May 3, 1900.	25 "	
Lewis Point.....	J. G. Scrimigeour...	Oct. 14, 1896.	25 "	
McGee's Wharf, Abram's Vill.	Norman Gallant	Nov. 9, 1891.	25 "	
Mink River or Murray Har-	James P. Clow.....	Aug. 25, 1900.	25 "	
bour, North.....	J. McKinnon.....	Jan. 27, 1896.	25 "	
Murray Harbour, South.....	Edward Harrington.	Oct. 29, 1885.	25 "	
Nine Mile Creek.....	Rodk. J. Steele.....	May 1, 1901.	25 "	42 27
North Cardigan.....	Malcolm McLeod...	Jan. 3, 1901.	25 "	
Pinette.....	M. M. Haley.....	Oct. 13, 1896.	25 "	43 69
Pownal.....	Arch. Smith.....	April 3, 1900.	25 "	18 43
Red Point.....	John Dickson.....	Dec. 10, 1896.	25 "	12 24
St. Mary's Bay.....	Angus McDonald,			
Souris.....	caretaker.....	Sept. 27, 1894.	25 "	
South Rustico, Oyster Bed	D. Gallant.....	Feb. 23, 1895.	25 "	
Bridge.....	Well'g'n A. Johnston	May 3, 1900.	25 "	
Stevens and Montague....	Bernard Kearney....	Sept. 18, 1885.	25 "	31 98
Sturgeon River.....	A. J. Gaudet.....	Aug. 23, 1898.	25 "	4 88
Tignish.....	W. M. Forbes	April 22, 1902.	25 "	76 99
Vernon River	James Young.....	" 10, 1899.	25 "	19 97
Wood Island.....				
Total.....				979 10

RECAPITULATION.

Ontario.....	\$	1,762	94
Quebec..		1,472	01
Nova Scotia		4,513	48
New Brunswick.....		1,289	23
Prince Edward Island.....		979	10
<hr/>			
Total wharfage dues collected and placed to credit of Receiver General.....	\$	10,016	76
ADD—Fees received by undermentioned harbour masters in excess of remuneration allowed :—			
Harbour Master—Fort William, Ont.....	\$	332	50
“ Midland, Ont.....		16	50
“ St. Johns, Que.....		188	00
“ Sorel, Que.....		47	50
“ Canso, N.S.....		42	50
“ International Pier, N.S.....		214	50
“ Hillsboro, N.B.....		19	50
“ Chemainus, B.C		54	00
“ Victoria, B.C.....		96	00
<hr/>			
	\$	1,011	00
<hr/>			
Total Revenue from Wharfs and Harbours.....	\$	11,027	76

APPENDIX No. 21.

STATEMENT *Re* SHIPMENT OF LIVE STOCK.

RECORD of Live Stock Shipped from Port of Montreal during the following months of the Year 1904.

MAY.

No.	Date.	Steamer.	Destination.	Sheep.	Total Cattle.	Horses.	Hay for Feed.	Grain for Feed.	Number of men.
	1904.						Lbs.	Lbs.	
1	May 11..	Corinthian.....	Glasgow.....		685	11			24
2	" 12..	Sardinian.....	".....		492				20
3	" 13..	Iona.....	London. .		556				22
4	" 14..	Salacia.....	Liverpool .		704	1			27
5	" 15..	Englishman.....	Bristol .	183	330				11
6	" 15..	Hibernian.....	London.....		603				24
7	" 16..	Montcalm.....	Liverpool .		525				21
8	" 17..	Montreal.....	London.....		476	5			19
9	" 17..	Fremona.....	".....		553				22
10	" 17..	Maur City.....	Manchester..		560	2			17
11	" 18..	Marina.....	Glasgow.....		804	32			31
12	" 19..	Buenos Ayrean .	Liverpool .		575				22
13	" 19..	Mexican.....	London.....		364				14
14	" 20..	Escalona.....	New Castle..		214				9
15	" 20..	Monteagle.....	Liverpool .		415				30
			Bristol.....		350				
16	" 21..	Pretorian.....	Liverpool .		294				9
17	" 22..	Devona.....	London.....		553				22
18	" 23..	Milwaukee.....	Liverpool .		648				25
19	" 25..	Assyrian.....	Glasgow.....		707				24
20	" 25..	Parthenia*.....	".....	115	785	14			29
21	" 27..	Manr. Commerce..	Manchester..	147	540				18
22	" 28..	Hungarian.....	London. .	32	558				23
23	" 28..	Virginian.....	".....		612				25
24	" 28..	Kildona.....	".....	108	290				12
25	" 29..	Turcoman.....	Liverpool .		292				21
			Bristol.....		350				
Total for month..				585	†13,835	65	3,699,080	1,104,135	521

Will take 100 more cattle at Quebec. † 4,056 United States cattle included in the total shipments.

TOTAL Live Stock Shipments from year 1904, were as follows:—

No.		Sheep.	Cattle.	Cattle Lost.
34	Same date 1903.....	2,290	22,778	92
29	" 1902.....	536	10,090	158
36	" 1901.....	8,454	11,332	292
31	" 1900.....	2,314	11,426	727
36	" 1899.....	3,365	12,983	674

POPE & DELORME,
Inspectors.

MONTREAL, May 31, 1904.

RECORD of Live Stock shipped from Port of Montreal, &c.—*Continued.*

JUNE.

No.	Date.	Steamer.	Destination.	Sheep.	Total Cattle.	Horses.	Hay for Feed.	Grain for Feed.	Number Men.
	1904.						Lbs.	Bush.	
26	June 1	Lord Lansdowne	Cardiff	155	200				9
27	" 1	Lakonia	Glasgow		807				32
28	" 2	Monte Videan	Liverpool		672				19
29	" 3	Montfort	Liv'pol-Bristol		*797				30
30	" 4	Montezuma	London	75	650				30
31	" 4	Hurona	"	288	531				22
32	" 5	Bellona	Newcastle		271				11
33	" 5	Tampican	London		573				23
34	" 5	Man. Corporation	Manchester		517				16
35	" 7	Monmouth	Liverpool	215	561				24
36	" 8	Pomeranian	Glasgow		579				23
37	" 8	Athenia	Liverpool	215	1,121	37			36
38	" 11	Ontarian	London	160	565				16
39	" 12	Manxman	Liv'pol-Bristol		†520				22
40	" 12	Cervona	London	480	502				28
41	" 12	Mount Temple	"		704				23
42	" 15	Kastalia	Glasgow		709				28
43	" 15	Corinthian	Liverpool		700				23
44	" 16	Man. Trader	Manchester	420	261				12
45	" 16	Mount Royal	Liverpool		616				25
46	" 18	Iona	London		557				22
47	" 19	Montcalm	Liv'pol-Bristol		‡774				31
48	" 22	Sardinian	Glasgow		476	16			20
49	" 22	Salacia	Liverpool	340	627				27
50	" 22	Montrose	London		353				14
51	" 25	Fremona	"	338	532				23
52	" 26	Englishman	Bristol	600	330				12
53	" 26	Man. City	Manchester	399	595				21
54	" 29	Sicilian	Liverpool	241	659	14			28
55	" 29	Alcides	Glasgow		504				24
Total for June				3,916	17,153	67	4,592,460	1,414,135	674
Previously rep'd.				585	13,835	65	3,699,080	1,104,135	521
Total to date				4,501	30,988	132	8,291,540	2,518,270	1,195
72	Same date	1903		6,777	44,595	144			
59	"	1902		8,277	20,243	237			
67	"	1901		16,465	22,395	486			
67	"	1900		7,131	25,377	1,399			
75	"	1899		11,835	28,837	1,553			

*Liverpool 447, Bristol 350. †Liverpool 320, Bristol 200. ‡Liverpool 425, Bristol 349. ¶Horses and sheep to Glasgow.

POPE & DELORME,
Inspectors.

MONTREAL, June 30, 1904.

SESSIONAL PAPER No. 21

RECORD of Live Stock shipped from Port of Montreal during the year ending June 30, 1904.

No. Ships.	Date.	Sheep Shipped.	Total Cattle.	Horses Shipped.	Number Men.
184	July 1, 1903, to Nov. 30, 1903	53,240	102,606	229	4,358
55	May 1, 1904, to June 30, 1904	4,501	30,988	132	1,195
239	Total for the year ending 30th June	57,741	133,594	361	5,553
	Totals for the year 1902-3	44,330	101,508	458	
	" " 1901-2	46,350	71,639	1,059	
	" " 1900-1	44,172	86,978	1,505	

The shipments are larger than usual owing in part to the ports of Portland and Boston being closed on account of foot and mouth disease until the 1st of September, 1903, when the embargo was removed. So far this year the numbers have been above the ordinary and present indications are that it will so continue through the season. The change from two to three feet in the width of the alleyways has worked to the satisfaction of all concerned and from reports the losses at sea have been slight, considering the large number of distillery cattle that have gone forward.

POPE & DELORME,
Inspectors.

MONTREAL, July 1, 1904.

RETURN of Live Stock shipped from Port of Montreal, &c.—Continued.
JULY.

No.	Date.	Steamer.	Destination.	Sheep.	<div>Rat Cattle.</div>	Total Cattle.	Horses.	Hay for Feed.	Grain for Feed.	Number of Men.
	1904.									
56	July 1..	Monteagle.....	Liverpool... Bristol	682	336 350	686	.....	.....	.....	23
57	" 2..	Montreal.....	London.....	870	.....	307	.....	.....	.....	17
58	" 2..	Devona.....	"	115	.....	428	.....	.....	.....	21
59	" 6..	Parthenia	Liverpool...	.....	.....	847	.....	.....	.....	32
60	" 6..	Pretorian.....	Glasgow .....	.....	.....	381	.....	.....	.....	15
61	" 7..	Hungarian.	London.....	139	.....	562	.....	.....	.....	23
62	" 8..	Escalona	Newcastle..	.....	.....	157	.....	.....	.....	6
63	" 9..	Man. Commerce	Manchester.	886	.....	530	.....	.....	.....	21
64	" 9..	Kildona	London.....	.....	.....	304	.....	.....	.....	12
65	" 10..	Turcoman	Liverpool... Bristol .....	.....	295 348	643	.....	.....	.....	21
66	" 12..	Mexican.....	London.....	.....	.....	388	.....	.....	.....	16
67	" 12..	Monmouth ..	Liverpool...	.....	.....	596	.....	.....	.....	22
68	" 13..	Pomeranian....	Liverpool... Glasgow .....	.....	335 248	583	.....	.....	.....	24
69	" 14..	Lakonia.....	Glasgow .....	.....	.....	817	.....	.....	.....	33
70	" 15..	Montford.....	Liverpool... Bristol .....	.....	382 350	732	.....	.....	.....	28
71	" 15..	Jacona	Newcastle..	.....	.....	242	.....	.....	.....	10
72	" 16..	Hurona	London.....	719	.....	488	.....	.....	.....	23
73	" 20..	Corinthian	Glasgow .....	.....	.....	695	.....	.....	.....	25
74	" 21..	Athenia	Liverpool...	368	.....	1,114	14	.....	.....	38
75	" 21..	Oxonian	London.....	600	.....	689	.....	.....	.....	28
76	" 21..	Ontarian	Glasgow	403	.....	557	.....	.....	.....	24
77	" 22..	Mount Royal...	Liverpool...	.....	.....	793	.....	.....	.....	32
78	" 23..	Manxman	Liverpool... Bristol .....	.....	200 320	520	.....	.....	.....	21
79	" 23..	Cervona	London.....	524	.....	506	.....	.....	.....	23
80	" 23..	Monarch.	South Africa	12	.....	66	5	.....	.....	4
81	" 24..	Man. Trader....	Manchester.	166	.....	362	.....	.....	.....	15
82	" 25..	Montezuma ..	London.....	1,138	.....	538	.....	.....	.....	27
83	" 26..	Virginian	"	75	.....	594	.....	.....	.....	24
84	" 27..	Sardinian.....	Liverpool...	.....	.....	497	.....	.....	.....	20
85	" 28..	Ka talia.....	Glasgow .....	.....	.....	700	.....	.....	.....	28
86	" 29..	Montreal	Liverpool... Bristol .....	.....	467 349	816	.....	.....	.....	32
87	" 30..	Iona.....	London.....	.....	.....	557	.....	.....	.....	22
		Total for July		6,697	...	17,695	19	5,040,190	1,327,760	715
		Previously reported.		4,501	...	30,988	132	8,291,540	2,518,270	1,195
		Total to date.....		11,198	....	48,683	151	13,331,730	3,846,030	1,910
112	Same date	1903.....		21,088	....	70,498	189			
90	"	1902.....		16,723	....	30,532	313			
98	"	1901.....		25,981	...	32,742	718			
103	"	1900.....		13,259	....	39,812	1651			

Montreal, July 31, 1904.
POPE & DELORME,
Inspectors.

SESSIONAL PAPER No. 21

RECORD of Live Stock shipped from Port of Montreal, &c.—*Continued.*

AUGUST.

No.	Date.	Steamer.	Destination.	Sheep.	Total Cattle.	Horses	Hay for Feed.	Grain for Feed.	Number Men.
	1904.						Lbs.	Bush.	
88	Aug. 2.	Lord Lansdowne.	Cardiff.....		217				9
89	" 3.	Mount Temple...	London.....		769				31
90	" 3.	Sicilian	Glasgow.....		712				23
91	" 4.	Salacia.....	Liverpool.....		700				28
92	" 4.	Livonian.....	London.....	153	637				26
93	" 6.	*Fremona	"		568				23
94	" 6.	Manchester City..	Manchester...	594	597				26
95	" 7.	Englishman.	Bristol		330				10
96	" 10.	Pretorian	Liverpool.....		381				15
97	" 11.	Tampican	London.....		665				26
98	" 11.	Marina	Glasgow.....		824	15			31
99	" 11.	Milwaukee	Liverpool.....	461	1,099				46
100	" 12.	Monteagle	Livrpl-Bristol.		†740				30
101	" 13.	Montrose.....	London.....		604				24
102	" 13.	Devona	"	612	486				22
103	" 17.	Pomeranian	Glasgow.....		589				23
104	" 18.	Hungarian.....	London.....		581				23
105	" 18.	Parthenia.....	Liverpool.....		885				31
106	" 18.	Kingstonian.....	London.....		606				25
107	" 18.	Toronto	Liverpool.....		594				20
108	" 20.	Man. Commerce ..	Manchester...	637	530				22
109	" 20.	Kildona.....	London.....	387	254				12
110	" 21.	Turcoman	Livrpl-Bristol.		†640				20
111	" 24.	Montreal.....	London.....		470				19
112	" 24.	Corinthian.....	Liverpool.....		700				25
113	" 25.	Lakonia	Glasgow.....		803	11			33
114	" 25.	Bellona	Liverpool.....		515				21
115	" 26.	Mount Royal.	"	183	879				33
116	" 26.	Montfort.....	Livrpl-Bristol.		• 834				34
117	" 27.	Hurona.....	London.....	621	492				22
118	" 31.	Sardinian.....	Glasgow.....		498				21
Total for August				3,648	19,099	27	5,555,049	1,003,195	714
Previously rep'd.				11,198	48,683	151	13,331,730	3,846,030	1,910
Total to date ...				14,846	67,782	178	18,886,779	4,849,225	2,624
151	Same date 1903.			28,609	94,151	223			
123	" 1902			21,256	43,340	354			
131	" 1901			31,387	45,239	848			
147	" 1900			16,395	56,498	2,242			
152	" 1899			30,810	56,240	3,143			

* SS. Southwark 1 horse. † Bristol 350, Liverpool 390. ‡ Bristol 348, Liverpool 292. ¶ Bristol 351, Liverpool, 483.

POPE & DELORME,

Inspectors.

MONTREAL, August 31, 1904.

RECORD of Live Stock shipped from Port of Montreal, &c.—Continued.
SEPTEMBER.

No.	Date.	Steamer.	Destination.	Sheep.	Total Cattle.	Horses.	Hay for Feed.	Grain for Feed.	Number Men.
	1904.						Lbs.	Bush.	
119	Sept. 1.	Lake Erie	Liverpool			28			2
120	" 1.	Ontarian	London		600				24
121	" 1.	Athenia	Liverpool	431	1,136				42
122	" 3.	Lake Michigan	London	691	457				21
123	" 3.	Cervona	"	370	522				22
124	" 3.	Mexican	"		388				15
125	" 3.	Man. Trader	Manchester	299	377				15
126	" 4.	Manxman	Liv'po'l-Brist'l		*521				16
127	" 8.	Kastalia	Glasgow	81	615				25
128	" 8.	Sicilian	Liverpool		712				25
129	" 9.	Montcalm	Liv'po'l-Brist'l		†815				33
130	" 10.	Iona	London	280	523				22
131	" 15.	Pretorian	Glasgow		356	17			14
132	" 15.	Oxonian	London	600	689				28
133	" 15.	Salacia	Liverpool	74	672				27
134	" 15.	Livonian	London	847	560				25
135	" 15.	Montezuma	"		409				16
136	" 16.	Milwaukee	Liverpool	855	580				27
137	" 17.	Fremona	London	669	485				22
138	" 18.	Man. City	Manchester	360	519				18
139	" 18.	Englishman	Bristol	658	329				12
140	" 22.	Oreana	South Africa		46				2
141	" 22.	Pomeranian	Liverpool		517				21
142	" 22.	Marina	Glasgow		688				25
143	" 22.	Virginian	London	265	593				25
144	" 23.	Monteagle	Liv'po'l-Brist'l	1,182	‡573				28
145	" 24.	Man. Importer	Manchester		240				8
146	" 24.	Devonfa	London	1,368	400				22
147	" 25.	Mount Temple	"	800	721				32
148	" 29.	Parthenia	Liverpool		604				20
149	" 29.	Corinthian	Glasgow	49	520				21
150	" 29.	Hungarian	London		579				23
151	" 30.	Mount Royal	Liverpool	112	726				30
Total for September				9,991	17,471	45	5,295,041	1,083,059	708
Previously reported				14,846	67,782	178	18,886,779	4,849,225	2,624
Total to date				24,837	85,253	223	24,181,820	5,932,284	3,332

* Bristol 192, Liverpool 329. † Bristol 200, Liverpool 615. ‡ Bristol 149 sheep, 200 cattle ; Liverpool 1,033 sheep, 373 cattle.

No.		Sheep.	Cattle.	Horses.
226	Same date 1903	48,418	134,662	341
181	" 1902	38,561	64,808	158
190	" 1901	41,415	67,704	1,160
217	" 1900	29,411	87,976	2,710

POPE & DELORME,
Inspectors.

MONTREAL, Oct. 1, 1904.

SESSIONAL PAPER No. 21

RECORD of Live Stock Shipped from Port of Montreal, &c.—Continued.

OCTOBER.

No.	Date.	Steamer.	Destination.	Sheep.	Total Cattle.	Horses.	Hay for Feed.	Grain for Feed.	Number of Men.
	1904						Lbs.	Bush.	
152	Oct. 1	Man. Commerce..	Manchester	37	243				9
153	.....	Kildona.....	London.	504	237				12
154	Oct 3..	Turcoman	{ Liverpool.		* 447				18
			{ Bristol....	687					
155	" 5..	Montrose	London.....	1,238	290				18
156	" 6..	Sardinian	Liverpool ..		439				18
157	.....	Lakonia.....	Glasgow.....	39	544	14			23
158	Oct. 7..	Montfort	{ Liverpool.	150	+ 780				32
			{ Bristol						
159	.....	Tampican.	London		666				26
160	Oct. 8..	Hurona	"	1,632	373				21
161	" 9..	Ontarian.....	"	999	361				18
*162	" 13..	Man. Trader.....	Manchester.		+ 263				10
163	.....	Sicilian	Glasgow.....		529	6			17
164	.....	Athenia	Liverpool.....	1,076	946				33
165	.....	Kingstonian ..	London		613				18
166	Oct. 14..	Manxman	{ Liverpool.		|| 520				16
			{ Bristol						
167	" 15..	Cervona.....	London	760	474				22
168	" 20..	Pretorian	Liverpool.....		367	17			17
169	.....	Salacian	Glasgow.....	77	679				27
170	Oct. 21..	Montcalm.	{ Bristol		§ 638				32
			{ Liverpool.	1,150					
171	" 22..	Milwaukee.....	"	753	993				42
172	" 23..	Iona.....	London	722	469				22
173	" 27..	Pomeranian..	Glasgow.....		484				19
174	.....	Livonian.....	London		659				26
175	.....	Marina	Liverpool.....	306	836	1			33
176	Oct. 27..	Wyandotte....	South Africa		75	1			3
177	" 28..	Lake Michigan.	London	749	314				17
178	" 30..	Man. City	Manchester.	261	594				25
179	" 31..	Bellona	Liverpool.....		456				18
Total for October				11,190	14,289	39	4,539,470	860,802	592
Previously reported.....				24,837	85,253	223	24,181,820	5,934,282	3,332
Total to date				36,027	99,542	262	28,721,290	6,793,086	3,924

* Liverpool 298, Bristol 149. † Liverpool 630, Bristol 150. ‡ Taking 1,150 sheep and 28 cattle at Charlottetown, P.E.I. || Liverpool 370, Bristol 150. § Bristol 150, Liverpool 488.

No.		Sheep.	Cattle.	Horses.
226	Same date 1903	48,480	134,665	341
181	" 1902	38,561	64,808	458
190	" 1901	41,415	67,704	1,160
217	" 1900	29,411	81,976	2,710

POPE & DELORME,
MONTREAL, October 31, 1904.

Inspectors.

RECORD of Live Stock shipped from Port of Montreal, &c.—*Continued.*

NOVEMBER.

No.	Date.	Steamer	Destination.	Sheep.	Total Cattle.	Horses.	Hay for feed.	Grain for Feed.	Number of Men.
	1904.						Lbs.	Bush.	
180	Nov. 1..	Fremona	London.	1,050	441	...	.....	.....	22
181	" 3..	Corinthian.....	Liverpool		698	...	.....	.....	27
182	" 3..	Parthenia	Glasgow	104	799	14	.....	.....	29
183	" 5..	Mexican	Liverpool		388	...	.....	.....	16
184	" 7..	Mount Royal.	"	838	926	...	.....	.....	41
185	" 7..	Oxonian.....	London.....	607	650	...	.....	.....	29
186	" 7..	Devona	"	161	537	4	.....	.....	22
187	" 8..	Manr. Commerce ..	Manchester.....		248	...	.....	.....	10
188	" 10..	Lakonia	Liverpool		800	...	.....	.....	32
189	" 10..	Sardinian	Glasgow		398	...	.....	.....	16
190	" 10..	Hungarian.....	London.....	483	515	8	.....	.....	23
191	" 11..	Turcoman.....	{ Bristol.....		90	1	.....	.....	20
			{ Liverpool		552	1	.....	.....
192	" 11..	Virginian	London.....	303	594	...	.....	.....	25
193	" 13..	Hurona	"	928	457	...	.....	.....	22
194	" 16..	Manr. Importer ..	Manchester.....	490	281	...	.....	.....	13
195	" 17..	Sicilian	Liverpool		629	16	.....	.....	26
196	" 17..	Athenia	Glasgow....	1,247	797	...	.....	.....	32
197	" 18..	Mount Temple.....	London.....	857	471	1	.....	.....	24
198	" 19..	Montfort	{ Bristol.....	300	166	1	.....	.....	29
			{ Liverpool	1,161	395	1	.....	.....
199	" 19..	Manxman	"		516	...	.....	.....	20
200	" 20..	Kildona	London.....	675	220	...	.....	.....	12
201	" 20..	Melville.....	South Africa..		45	5	.....	.....	3
202	" 22..	Pretorian	Liverpool	713	241	...	.....	.....	13
203	" 22..	Salacia	"	1,499	509	...	.....	.....	27
204	" 23..	Ontarian.	Glasgow	135	670	6	.....	.....	24
205	" 26..	Manr. Trader	Manchester.....	* 500	136	...	.....	.....	8
		Total for November.....		12,048	13,069	53	4,176,209	753,038	536
		Previously reported		36,027	99,542	262	28,721,290	6,793,086	3,924
		Total for season		48,075	112,611	315	32,897,499	7,546,124	4,460

* Taking 2,000 sheep and 40 cattle at Charlottetown.

Total Live Stock Shipments from the year 1899 were as follows:—

No.		Sheep.	Cattle.	Horses.
265	Season of 1903.....	60,017	147,201	373
214	" 1902.....	45,830	77,516	549
214	" 1901.....	54,538	73,791	1,338
248	" 1900.....	34,838	92,180	2,833
239	" 1899.....	58,277	81,804	4,739

POPE & DFLORME,
Inspectors.

MONTREAL, November, 1904.

RECORD of Live Stock shipped from Port of Halifax, N.S.

Number.	Date.	Steamer.	Destination.	SHEEP.		CATTLE.		Horses Shipped.	Hay for Feed.	Grain for Feed.	Num-ber Men.	Remark.
				Shipped	Lost.	Fat.	Total.						Lost.
1904.												
1	Jan. 7	Lakonia	Liverpool	148		540	540	1	145,650	45,138	22	540 U. S. Cattle.
2	" 11	Laurentian	"			112	112		29,700	9,000	5	
3	" 25	Montcalm	London	688		218	218		73,790	27,000	12	
4	" 26	Sicilian	Liverpool			284	284		66,150	24,492	12	284 U. S. Cattle
5	" 29	Salacia	" and Glasgow	220		625	625	15	164,100	43,000	28	446 U. S. Cattle
6	Feb. 6	Lake Michigan	London			447	447	5	118,800	35,800	18	340 were U.S. Cattle.
7	" 13	Pretorian	Liverpool			340	340	2	76,497	27,200	14	
8	" 21	Lakonia	" and Glasgow	388	14	308	308	1	90,450	30,718	14	
9	" 23	Montrose	London			36	36		8,460	2,600	2	
10	" 24	Florence	"					1	300	162	1	
11	Mar. 11	Almorat	Liverpool and Glasgow			354	354		90,240	28,500	15	232 were U S. Cattle.
12	" 14	Pretorian	"			68	68		15,300	5,400	3	
13	" 31	Lakonia	" and Glasgow	31		772	772	14	219,230	64,650	28	290 were U.S. Cattle.
14	April 18	Pretorian	"			384	384		86,400	30,700	13	367 were U.S. Cattle.
15	" 20	Austrian	"			204	204		55,080	16,500	8	68 were U. S. Cattle
16	June 6	Tritonia	"			764	764		170,000	50,000	25	526 were U.S. Cattle.
Total for year				1,475	14	5,456	5,456	9	1,410,147	440,860	222	3,093 U. S. Cattle.

DAVID HUNTER,
Port Warden.

4-5 EDWARD VII., A. 1905

RECORD of Live Stock Shipments from the Port of St. John, N.B., during the year 1904.

Date.	SHEEP.		CATTLE.				HORSES.		Hay for Feed.	Grain for Feed.	Num- ber Men.
	Shipped	Lost.	Fat.	Stock- ers.	Total.	Lost.	Ship- ped.	Lost.			
1904.											
January.....	1,048	87	5,553	100	5,653	29			1,957,420	655,000	262
February.....	4,413	58	4,581	221	4,802	13			1,495,455	493,400	219
March.....	3,863	26	4,140	265	4,405	14			1,321,310	423,200	194
April.....	2,706	22	4,746	500	5,246	34	31		1,508,805	475,670	204
May... ..			544		544	1			165,100	40,300	20
August.....			929		929	1			260,620	37,000	31
September. .			598		598				180,070		24
October.....	1,000	4	1,411		1,411	7			447,180	24,500	56
November ..	3,156	44	1,142		1,142	2			423,160	112,400	56
December.	4,242		1,125		1,125	13			388,785	137,240	70
	23,428	241	24,769	1,086	25,855	114	31		8,147,905	2,398,710	1,136

F. J. HARDING,
Agent.

RECORD of Live Stock shipped from Port of Charlottetown during the following Months, 1904.

Date.	Steamer.	Destination.	Sheep.	Cattle Fat.	Hay for Feed.	Grain for Feed.	Turnips.	Num- ber of Men.
1904.					Tons.	Bush.	Bush.	
Oct	Manchester Trader... ..	Manchester. .	1,722	16	12	150 Oats	60	8
Dec ..	" ..	" ..	2,049	17	30	530 "	500	9
Total.	" ..	" ..	3,771	33	42	680 "	560	17

H. P. WELSH,
Inspector.

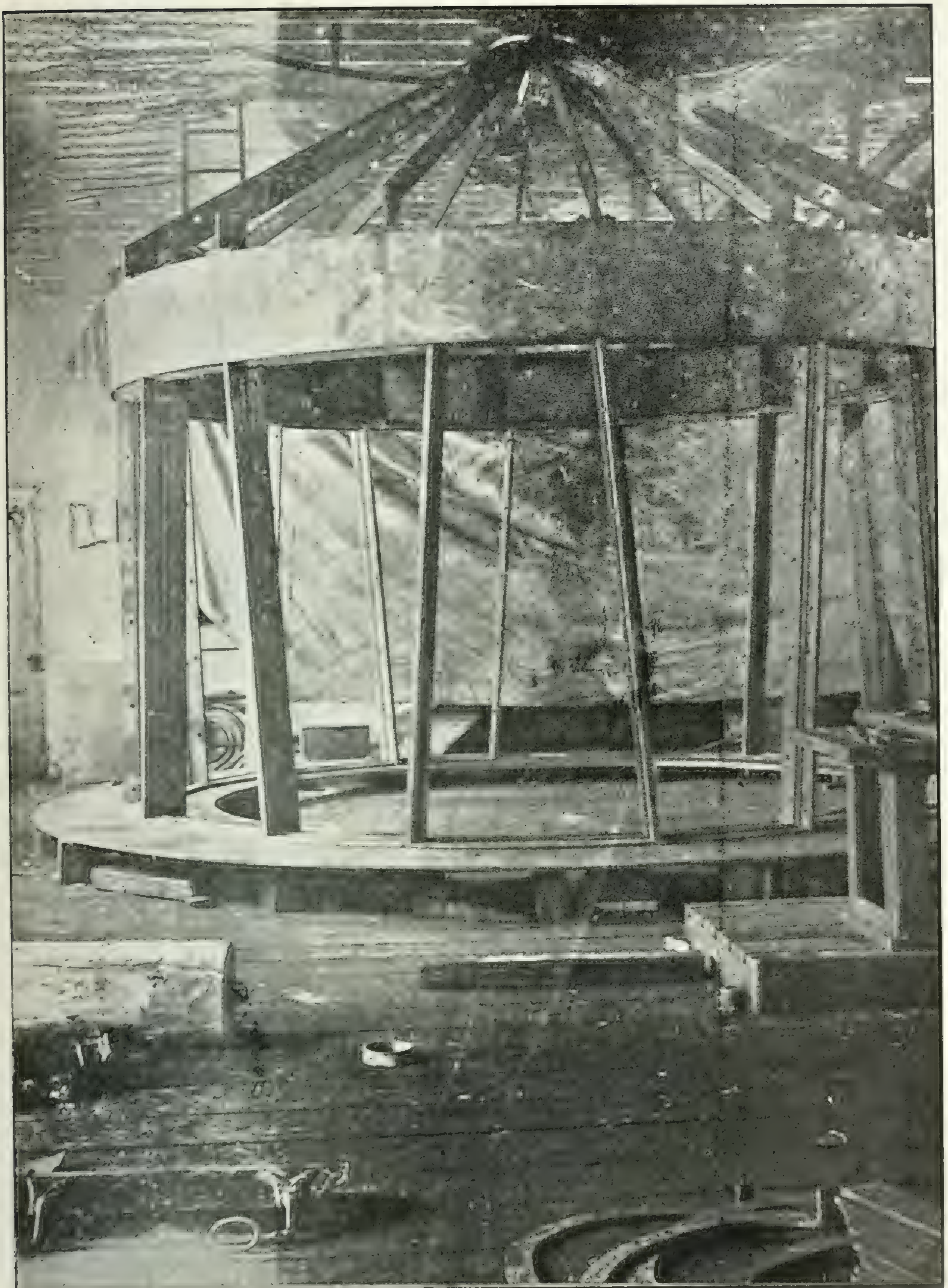
Mr. W. Simons, Port Warden, Quebec, reports that the shipment of Live Stock from Quebec during the season of 1904 was 100 cattle by the steamer *Parthenia* on the 26th May.

APPENDIX No. 22.

REWARDS FOR SAVING LIFE.

LIST of persons to whom rewards have been granted by the Government of Canada for gallant and humane services rendered in life-saving from shipwrecked vessels, or by British and Foreign Governments for similar services rendered by Canadian vessels in saving life from shipwrecked British and Foreign vessels.

Names and Designations of Persons.	Nature of Services Rendered.	Date of Services Rendered.	Description of Reward.
Howard I. Atkinson, Moses Atkinson, Horatio H. Brannen and Harry Ross; fishing boat's crew from Stoney Island, N.S.	Gallant services in assisting to rescue the shipwrecked crew of the British ship <i>Drumalis</i> , of Liverpool, England	Aug. —, 1902.	A silver watch to the first, and \$10 to each of the others.
W. A. B. Smith, coxswain; and Thomas Marsden, W. C. Myrick, R. A. Smith, W. E. Lyle, Jas. Obed and H. S. Lyle, crew of lifeboat at Blanche, N.S.; and Stewart Swaim and Samuel Swaim.	Services in rescue of captain and crew of schooner <i>Empress</i> , of Charlottetown, P.E.I.	April 2, 1903.	\$1.50 to each man. \$13.50 in all.
Captain Alexander Brown, owner of tug <i>Gordon Brown</i> ; J. R. Moore, coxswain; Wm. Hough, Henry Cherry, Frank Eveland, Alonso Taylor, Frederick Pollock and Thos. Buff, Port Stanley, Ont.	Heroic conduct and valuable service in rescuing the crew of the American schooner <i>Mineral State</i> .	Oct. 30, 1902.	A gold watch to Captain Brown; a gold watch and chain to the coxswain of the lifeboat, and a gold medal to each of the others. Awarded by the President of the United States.
Arthur Pike, Five Finger Rapids, Yukon Territory.	Bravery in rescuing three men from drowning.	July —, 1901.	A binocular glass.
Alfred H. Griffith, Lighthouse keeper, "Giants Tomb," Midland, Ont.	Bravery in rescue of Wm. Gerow and his son, George Gerow, from drowning during a heavy gale and snow storm in Georgian Bay.	Nov. 9, 1901.	A binocular glass.
J. G. Kell, master; J. Hughes, chief officer; André Arias and Frank Engel, seamen, of the British steamship <i>Beacon Light</i> , of Liverpool, England.	Humane conduct in assisting to rescue the crew of the barque <i>Ossuna</i> , of Richibucto, N.B., at sea.	June 18, 1902.	A binocular glass to master and chief officer, and \$10 to each of the seamen.
Officers and crew of Belgian steamer <i>Noordland</i> .	Rescue of passengers of steamer <i>Pretoria</i> , of Southampton, England, which vessel was on fire in the North Atlantic.	Mar. 30, 1902.	£25 to master, £5 to 2nd officer, £5 to 3rd officer, £4 to 4th officer, £4 to boatswain, £3 to each of the two quartermasters, and £2 to each of the 18 seamen.
W. Swaktman, master; H. Wall, 1st officer; Thomas Upsall, boatswain; John McCambie, 3rd engineer; W. Kelly, John Ross and J. Andrews, able seamen, of British SS. <i>Mira</i> , of Newcastle, England.	Humane services and bravery in the rescue of the shipwrecked crew of schooner <i>J. N. Wylde</i> , of Port Medway, N.S. Vessel dismantled and foundering at sea.	Dec. 15, 1902.	A binocular glass to master, a gold medal to 1st officer, a silver medal to boatswain and to 3rd engineer, and \$10 to each of the seamen.
Alfred Abbott, master; Michael Cummins, 2nd officer; M. Matheson, boatswain; C. Grandy and J. Owens, seamen, of British steamship <i>Mystic</i> , of London, England.	Humane services in assisting in rescue of the crew of the wrecked schooner <i>Griqueland</i> , of Parsboro', N.S., at sea, off the coast of Nova Scotia.	Jan. 22, 1903.	A binocular glass to master, a gold medal to 2nd officer, \$15 to boatswain, and \$10 to each of the seamen.
Lemuel Wynacht and Israel Wynacht, of Black Rocks, N.S.	Bravery in rescuing a young man from drowning.	Mar. 20, 1903.	A silver watch to the first, and a gold medal to the latter.



IRON LANTERN UNDER CONSTRUCTION, FOR LENNARD ISLAND LIGHTHOUSE, B. C.



LOUISBURG FOG ALARM, N. S.



MICHIPICOTEN HARBOUR LIGHTHOUSE, ONT.



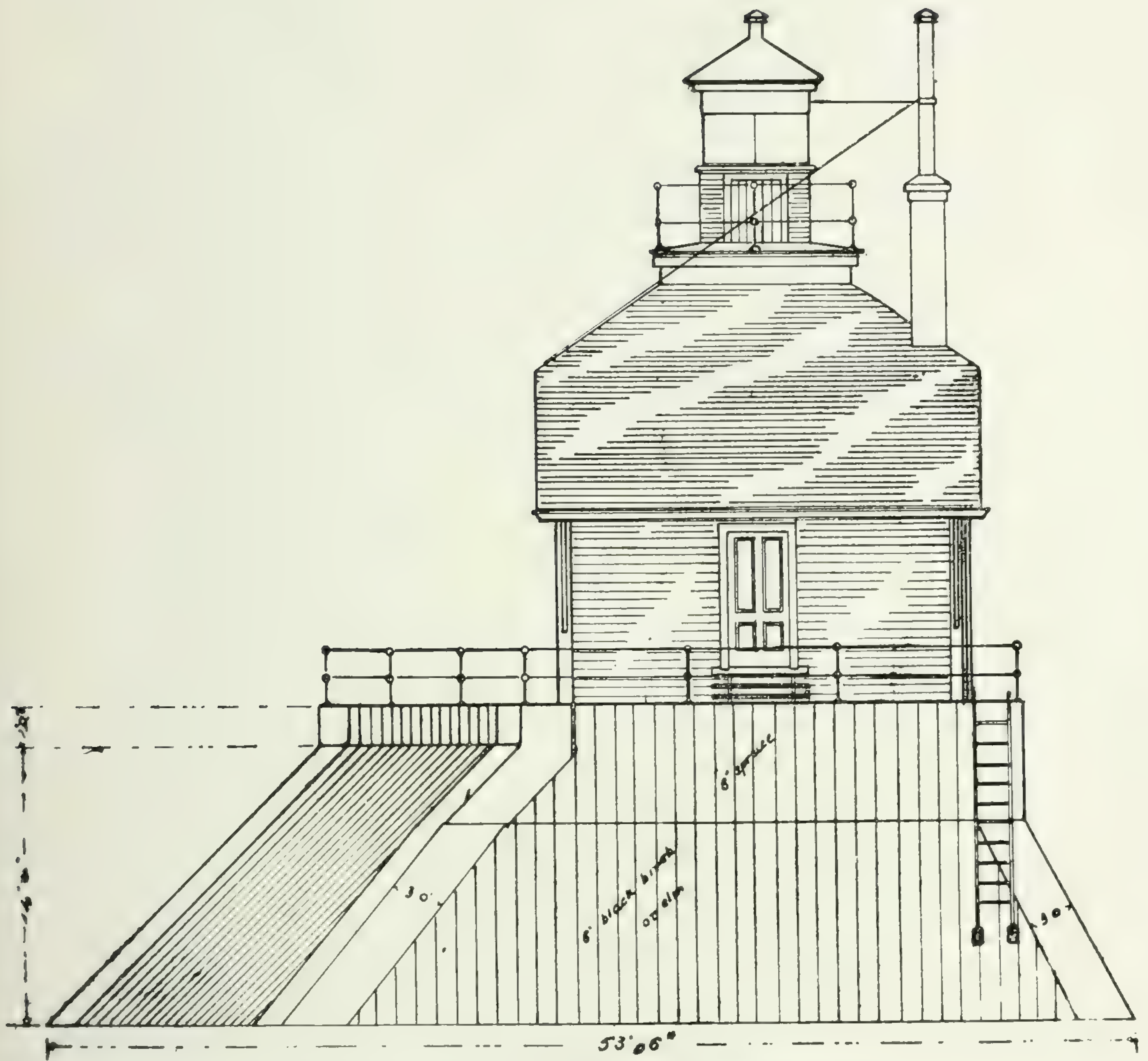
NIAGARA FRONT RANGE LIGHTHOUSE, ONT.



PORT COLBORNE BREAKWATER LIGHTHOUSE, ONT.



PORT COLBORNE BREAKWATER LIGHTHOUSE, UNDER CONSTRUCTION.



SANDY BEACH POINT LIGHTHOUSE AND PIER, QUEBEC.



DOMINION LIGHTHOUSE DEPOT, PRESCOTT, ONT.

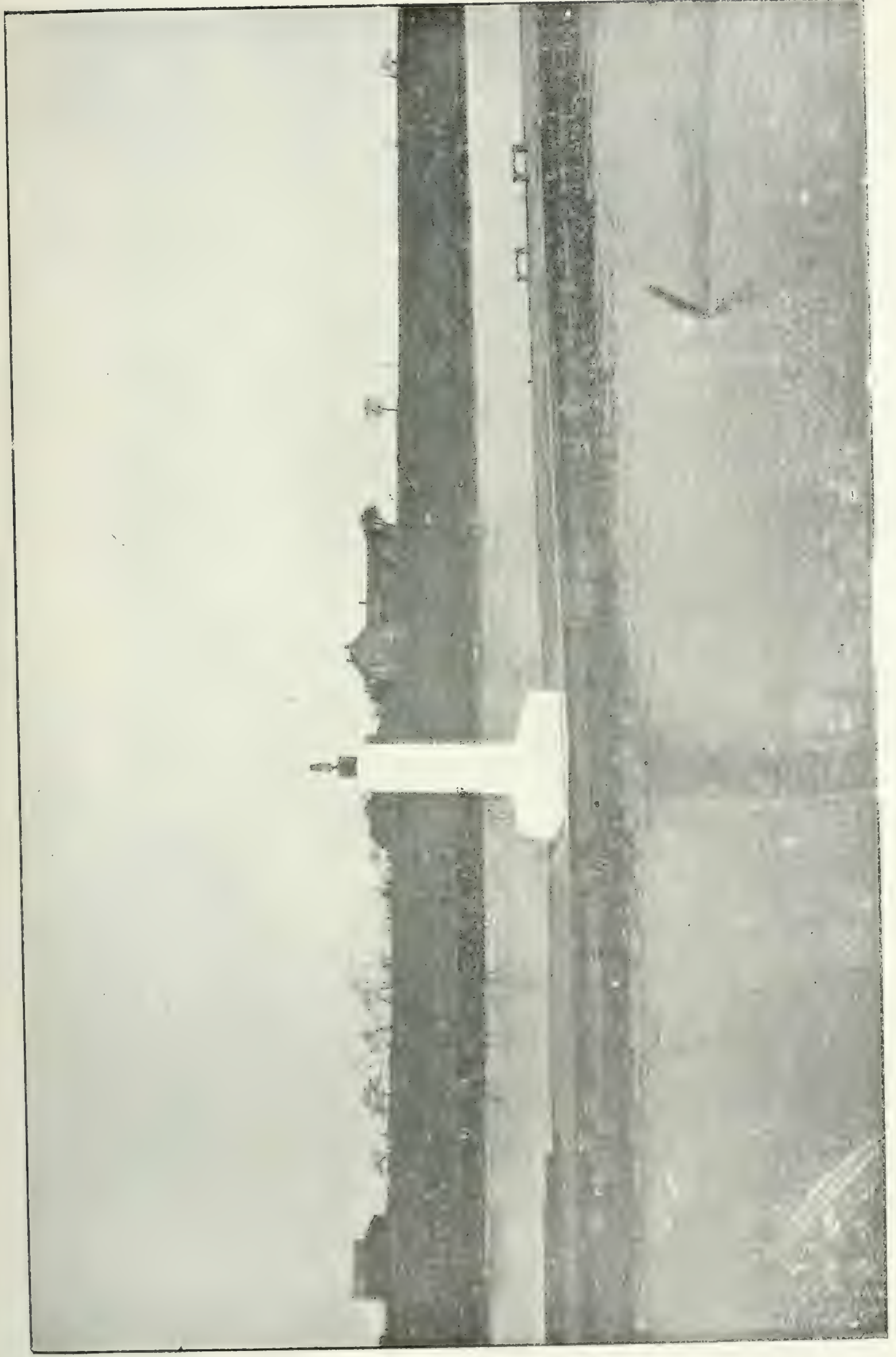


CATOPTRIC REVOLVING LIGHT.

Type of apparatus much used in Canadian lighthouse service and to be replaced by modern quick flashing lights.



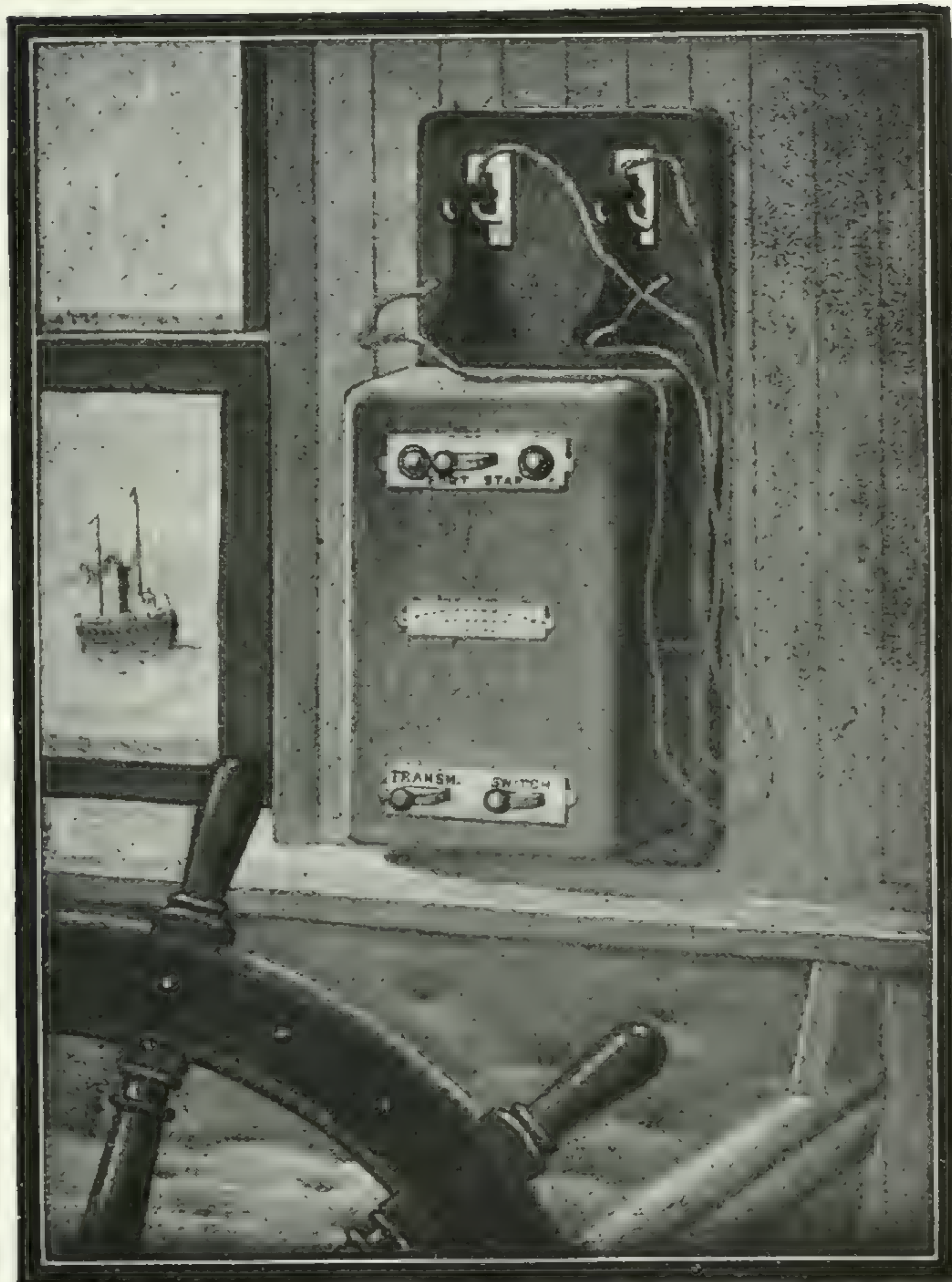
1ST ORDER QUICK FLASHING LIGHT ILLUSTRATING TYPE OF MODERN LIGHTHOUSE APPARATUS.



NORTH CHANNEL DYKE LIGHT.
Type of permanent steel and concrete gas light, Montreal-Kingston Division.

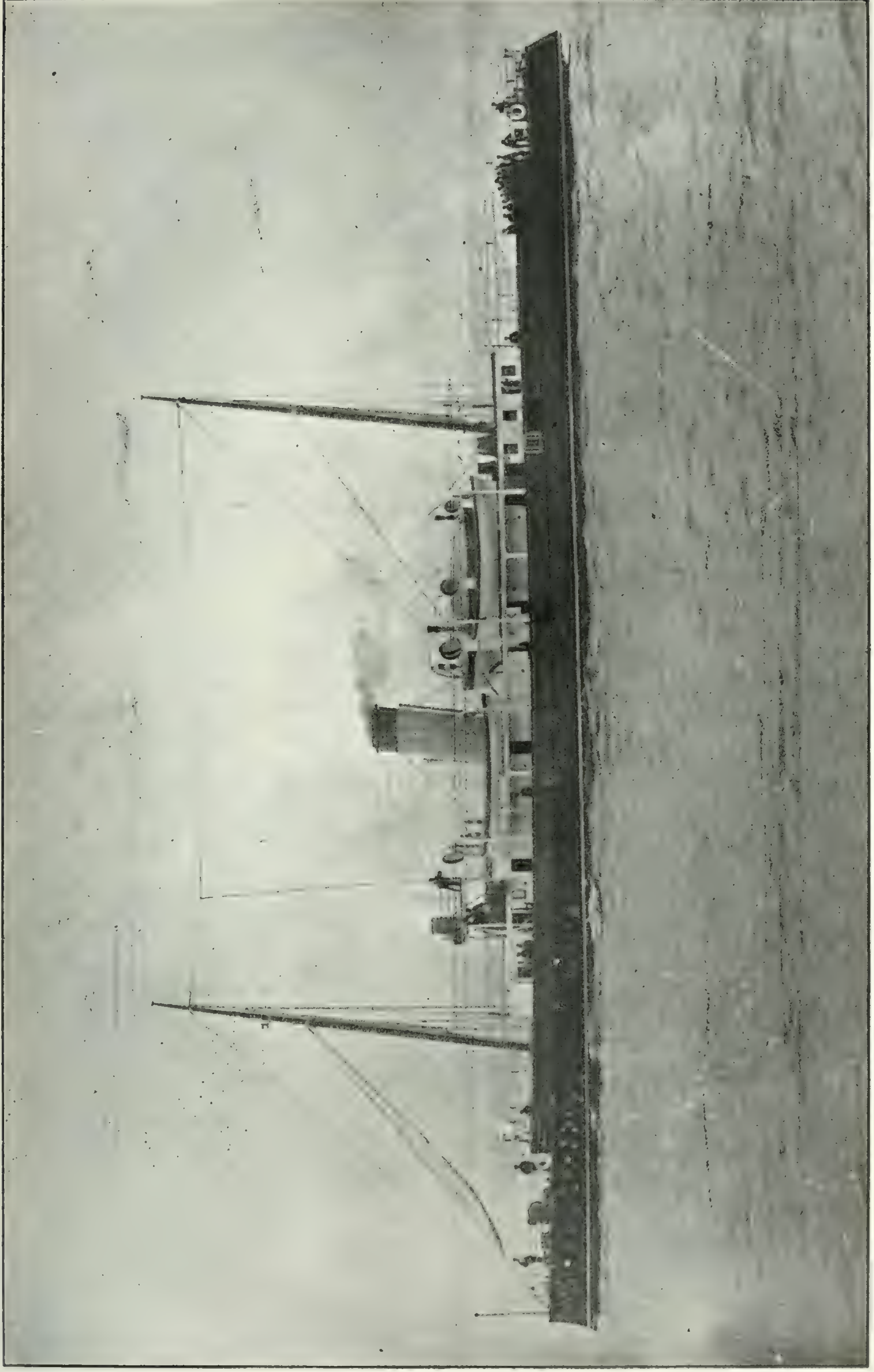


D. G. S. "SCOUT" LIGHTHOUSE & BUOY TENDER, MONTREAL-KINGSTON DIVISION



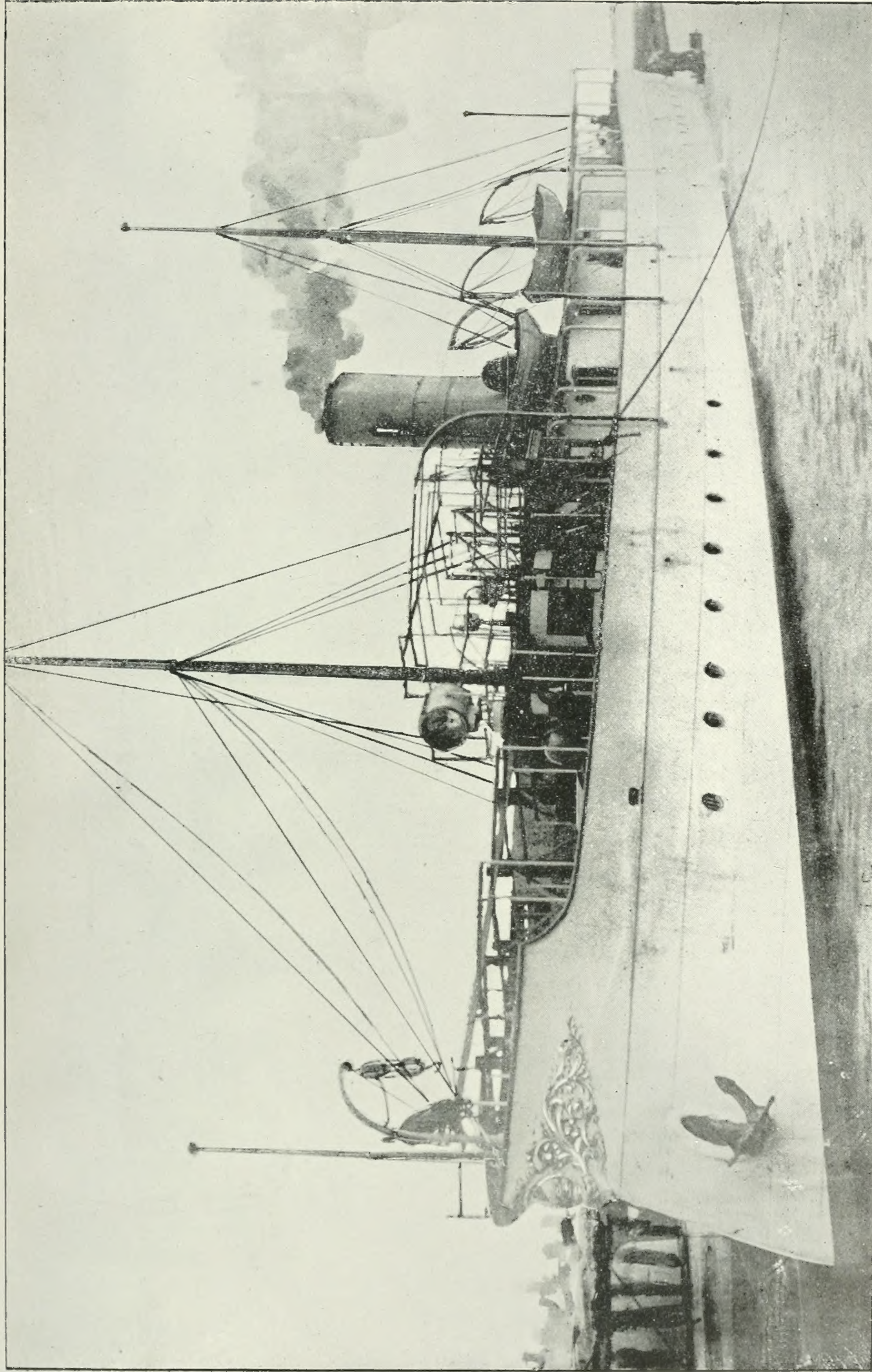
SUBMARINE SIGNAL.

Receiving apparatus in pilot house of vessel.



CANADIAN ARMED CRUISER "CANADA."

Speed 22 miles an hour. Armament 4 automatic Q. F. guns. Built by Vickers-Maxim, England.



CANADIAN ARMED CRUISER "VIGILANT."

Speed 22 miles an hour. Armament 4 automatic Q. F. guns. Built by Polson's, Toronto.

